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## ALCOHOL\*

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THOUGH there is no evidence that the ancients had any knowledge of the chemistry of fermentation, the preparation of alcoholic beverages appears to have been known to civilized man from time immemorial. Beer was a common drink in Egypt four thousand years ago and was attributed to Osiris. This deity was regarded amongst the Egyptians as the most beneficent of all of their gods. He was the god of the sun, of warmth, life, fruitfulness and the Nile. It, therefore, does not occasion any surprise that he was also credited with the discovery of beer which, according to Diodorus, he is supposed to have prepared from malted rye in the town of Pelusium in 2017 B.C. In his "Technical Arts of the Ancients," Neuberger records the brewing of beer from rye in ancient Babylonia in 2800 B.C., and there is reason to believe that it dates from a still earlier period.

Archæological discoveries justify the belief that the Sumerian civilization antedated that of the Egyptian; findings in the graves of the Kings of Ur indicate that the Sumerian civilization was many centuries old at the time of Menes, founder of the First Egyptian Dynasty; and, before Menes, Egypt was barbarous. Based upon the lowest estimate of the First Dynasty of Ur, the Sumerian civilization dates to about 3500 B.C. (Woolley, Leonard C., "Ur of the Chaldees"); and though there are no known records of beer amongst the Sumerians of that date, it is of interest to note that when the Egyptians settled in their country "kvass" was then regarded as a common beverage amongst the Hamitic populations, and these people date back to a far and unknown past. This "kvass" was prepared by soaking bread and allowing it to ferment—a practice common in Russia at the present time. The preparation of bread and beer appear to have run parallel in history. That the drink described as beer was as we understand it, a beverage capable of intoxication, is suggested from a description of its effect. I quote from an English translation of the 13th Maxim of the writer Ani, probably written during the 20th Dynasty (Neuberger). It says, "Do not get heated in the house in which in-

toxicating liquor is being drunk. . . Your legs will become paralysed and you will fall. . . Go home, for you have drunk your fill."

The history of wine is probably as old as, or may be older than that of, beer. From an account of an Egyptian exile, Sinuhe, who wrote about 2000 B.C., we get a glimpse of Palestinian life at the height of Babylonian influence. "It is an excellent land," says Sinuhe, "figs are there and grapes; wine is more plentiful than water. . . There are barley and wheat without end." This date is, however, comparatively recent. Vineyards were cultivated in Egypt at a very early period of its history. The most ancient monuments enumerate half a dozen famous brands, red and white. Four kinds of wine brought from the north, south, east, and west of the country formed part of the official repast and of the wine-cellars of the deceased from remote antiquity. (History of Egypt: Maspero). As slave labour was cheap, the vines were guarded by human beings to keep the birds away—a forerunner of the modern "scarecrow," but much more efficient.

Wine is mentioned frequently in Homer's *Odyssey*. It is found in the First Book; its preparation is described in the Seventh Book, and in the Ninth we meet with one of its attributes. Though the gods of heaven gave him "woes in plenty," Odysseus seems to have been able to forget his troubles occasionally. A feast is described and Odysseus appears to have enjoyed it thoroughly, for we find him saying,— "Nay, as for me, I say there is no more gracious or perfect delight than when a whole people make merry, and the men sit orderly at feast in the halls and listen to the singer, and the tables by them are laden with bread and flesh, and a wine bearer, drawing the wine, serves it round

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and pours it into the cups. This seems to me well-nigh the fairest thing in the world." Note the absence of drunkenness—"the men sit orderly at feast. . . ." One might, at first, conclude that it was not wine; that it was a mild and innocuous drink. Later, however, we find Maron, the priest of Apollo, placing before Odysseus a wine mixed with "twenty measures of water"; it, apparently, required dilution.

Wine is met with in the Bible in the ninth Chapter of Genesis ". . . and Noah the husbandman began, and planted a vineyard. And he drank of the wine and was drunken. . . ." Though the Bible is comparatively recent, when due consideration is given to its origin, it records facts of a far distant past; and if the story of wine is coterminous with that of the Flood, wine may have antedated beer. A digression with regard to the Flood may be of interest here.

The story of the Flood is widely distributed in ancient tradition and twenty-five hundred years ago the Assyrians, Chaldeans and Babylonians were as curious of its origin as we are at present. It was an age of historical inquiry. They had their archaeologists; and the rulers of the people were equally enthusiastic, so much so that, while Babylonia was besieged on every side by eager enemies, its last King, Nabonidus, instead of attending to domestic emergencies was digging in ruins, restoring old temples and writing memoirs on baked tablets. These people then also heard of some ancient hero who was warned of a flood and built an ark. Archaeologists investigated this story and recorded their results on tablets. The lower country of the Tigris and Euphrates had little or no stone; the people built with brick and wrote upon tile-like cakes of clay. Many of the latter were recently discovered, and further researches of the joint expedition of the British Museum and of the Museum of the University of Pennsylvania in Mesopotamia have disclosed its true origin. (Woolley, Leonard C., "The Sumerians"; "Ur of the Chaldees"; "Digging up the Past").

The agreement was general for some time that the story, as told in Genesis, had its origin in Sumerian legend and dates back many centuries before Abraham. In the Sumerian legend, the gods are angry and decide to destroy the race of man by drowning; but the secret is confided to Uta-Naphistim, a good man dwelling in the village of Shuruppak. On the advice of the gods, this good man built a vessel like the "ark". As Woolley puts it, viewed as parable or history, investigation shows that the essentials of the story are historically true. Innundations are common in Mesopotamia, and this disaster in the lower Tigris and Euphrates affected an area of about 400 miles long and 100 miles across; but to the occupants of the valley that was at the time the whole world. Uta-Naphistim was the Sumerian "Noah."

How the story found its way into the Bible is suggested from other records which are undoubtedly of Sumerian and later Babylonian origin. At least 1500 years before Moses, Sargon, founder of the Sumerian Akkadian Empire, says (in a tablet now in the British Museum) that he too was born in secret, placed by his mother in an ark of bulrushes daubed with pitch, and set adrift in the river; the Tower of Babel has its counterpart in the tower of brick built by the Sumerians to their god, En-lil; and centuries before Sinai, Hammurabi received his famous Code of Laws from Shamash,

the sun-god, and many of these laws are echoed in the Torah of Israel. The language is so similar, says Lowenthal (Lowenthal: "A World Passed By"), as to make it hard to doubt that the lightnings of Sinai are not reflecting the sun-rays of Shamash. There are the marriage customs, divorce laws, class differences, rights of slaves, mercantile and agricultural laws, and administration of justice. Finally, it will be recalled that Abraham is alleged to have come from Ur of the Chaldees. Palestine is far from the head of the Persian Gulf, but it came under early Sumerian and Babylonian influence more than a thousand years before the Jews entered into history.

Alcohol is not a product of civilization alone. It was known to early neolithic man. Mount Lebanon yielded "wheat" ten thousand or more years ago. Some of these products of the soil were undoubtedly stored, for storage of food is not an attribute peculiar to civilized men nor to man alone; animals store food. At one time, however, this art must have been far from perfect; and because of the imperfections, foods must have deteriorated. Before the advent of cold storage, canning, smoking, preserving and other means of storage, man must have had a wide experience with disintegrated food and, at times, he must have been rather pleasantly surprised to find that, in spite of deterioration, the taste of some foods improved.\* During disintegration some foods form alcohol, and travellers tell us that alcoholic preparations are not infrequently met with amongst uncivilized peoples.

We get a first glimpse of the scientific approach to alcohol in the history of the Arabians, to whom we are indebted for the word—al-koh'l.

We, in medicine, owe much to the followers of Mohammed. When most of Europe was in the midst of barbarism and just emerging from primitive conditions, the practice of medicine of these people was highly developed. We are indebted to them for many therapeutic agents (senna, rhubarb, camphor, etc.) and they were noted for their hospitals. These contained lecture halls, rooms for isolating cases and dispensaries for outdoor patients. We may still follow some of their practices with profit. When indigent patients, for example, were discharged from hospitals as cured, they were given gold pieces so that they might not be obliged to return to hard labour immediately. Sleeplessness, as we all know, interferes with recovery from illness. It is, therefore, of interest to note that when patients suffered from insomnia, and health was thereby impaired, they were entertained throughout the night by professional story tellers.

There are those who minimize the importance of these people. Arabian medicine is essentially a composite blend of Greek medicine, the medical practice of the Jews, and the astrology and occult lore of Egypt and India; and, admittedly, very few remain when those bearing Arabic names, but not of Arabic origin, are

\* I repeatedly suggest to some of my more intimate friends that the relish with which they eat "high" cheese which I find very objectionable is probably a relic of the days when their ancestors ate carrion.



removed from the list. Geber, Mesue, Rhazes and Avicenna were Nestorian Christians; Albucasis and Avenzoar were Spaniards; Averroes and Maimonides were Jews. The incontestable fact, however, is that it was the Arabian state of civilization which permitted the development of the Medicine of that period and alcohol was one of the products of this development.

Ibn Sina, or Avicenna (980-1036), is said to have described its preparation and properties. It was another two centuries before its value was discovered for the preparation of tinctures. The latter are usually credited to Raymond Lully, an alchemist (1235-1315). He, apparently, knew the art of concentrating alcohol by distillation and dehydration. Wohler (1828) is generally credited with the first preparation of an organic compound by artificial means—the synthesis of urea from ammonium cyanate; but Henry Hennell, an English apothecary, is stated to have synthesized ethyl alcohol in 1826—two years earlier. (La Wall, C. H., "Four Thousand Years of Pharmacy").

My purpose in these few references to the literature, historical, semi-historical and mythical, is to point out the antiquity of alcoholic beverages, which alone suggests that alcohol cannot at all times be harmful to man. It must have its favourable as well as its unfavourable attributes. This appears reasonable, unless one is prepared to assume that the operation of the laws of evolution do not apply to man—an assumption without foundation in theory or in fact.

How deeply rooted the habits of people are with respect to the use of alcoholic beverages is clearly shown in the following Chart (Chart

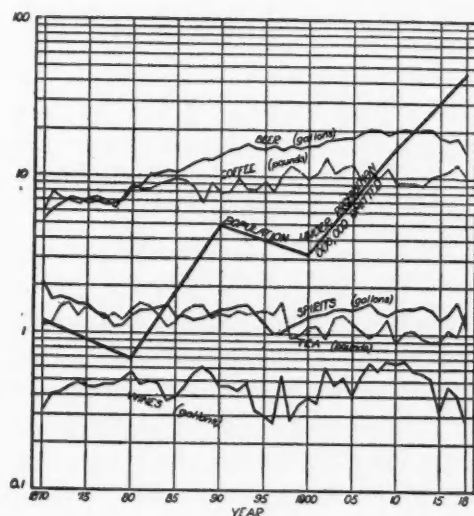


CHART 1.—Diagram showing the course from 1870 to 1918 of the consumption per head of various beverages in the United States, and the population living under state-wide prohibitory laws.

I) which I reproduce from "The Action of Alcohol on Man" (Starling, Hutchison, Mott and Pearl), with the kind permission of Professor Raymond Pearl and Messrs. Longmans, Green & Company. The data indicate the course from 1870 to 1918 of the consumption per head of various beverages in the United States, and the population living under state-wide prohibitory laws. This diagram brings out the fact that during a period of nearly half a century there was no direct or causal relationship between the consumption per head of alcoholic beverages and the existence of laws prohibiting the use of such beverages. It will be noted, though the populations living under state-wide prohibitory laws increased from slightly over 1,100,000 in 1870 to 45,000,000 in 1918, there was no decrease in the consumption of alcohol per head.

Alcohol has been regarded by some as a panacea for all ills, real and imaginary, and by others as the greatest curse of mankind; and the accumulation of data does not appear to have clarified our knowledge about it to any extent, for there is, as yet, much confusion of thought. It is my purpose, this evening, to approach the problem as, in my opinion, the physician should approach it; and, may I suggest, the physician has an excellent opportunity of evaluating alcohol, for, in addition to his appreciation of social and moral values in common with his fellow-men, he has the advantage of clinical experience; and of the facts of physiology and pathology. One must not, however, minimize social and moral values. They present problems with many ramifications and the importance of the data is paralleled by the difficulties of their interpretation. This accounts largely for the confusion of thought and the abundance of glittering hypotheses without foundation in fact. In its social and moral aspects, we find material in abundance for the prejudiced mind. In many cases, the prejudice may, at times, not be recognized, and one must unreservedly concede honesty of purpose; but it is prejudice, nevertheless. Here, we, also, find a fruitful field for the propagandist—the man whose desire is not to find the truth but to find support for his aims. In "The Action of Alcohol on Man" (Starling, *et al.*), a striking example is given of the difficulty of arriving at the truth under such conditions. At much trouble and expense an investigation was made of the rate of mor-

tality amongst persons who, either for the whole of life or for many years, were total abstainers from intoxicating drinks. The data indicated as high a rate of mortality among them as was found in other persons who were not abstainers, but the societies furnishing these data, on account of the unfavourable nature of the results arrived at, objected to their publication. The problem is further complicated by conclusions drawn from inadequate data. Evaluation is sufficiently difficult when we have all available facts. There is an old proverb—“When we have reached the summit of the mountain, heaven is no nearer, only the horizon has widened.” Conclusions drawn from limited data can under no circumstances have more than limited significance. This is an elementary principle of logic. Unfortunately, the medical profession is not entirely blameless. We, as well as any other class of men, have our quota of those who, though well-meaning, have a limited liability clause with respect to their capacity to ascertain and make use of facts. The medical literature affords many examples of improper use of experiment and of statistics; there are conclusions based upon inadequate experiments; upon proper experiments, but inadequate data; and comparisons are made between data which are not comparable.

Nor are we without our quota of propagandists. The difficulty of arriving at the truth is greater here, for it is generally assumed when a physician speaks about a subject such as alcohol that he does so with authority. The proper evaluation of alcohol depends upon a variety of knowledge, and the advice a physician gives his patient is, in my opinion, a fairly good test of his education and intellectual honesty—of his knowledge of facts and his capacity to allow no impulses other than the intelligence in making use of them. A properly educated physician is not influenced by the temper of the time. As Cowper Powys so aptly put it, “It is ever the mark of the parvenu in education to chafe and fret until his opinions correspond to the last word of modish sophistication.” Physicians afford no exception. We are all human. Therefore, some of us take a drink of alcohol at times and believe we are the better for it. Some do not take it at all, because of a dislike for the taste; while others avoid it on grounds of morality. None of these reactions, however, should govern our actions as physicians. Be-

cause a physician finds a particular substance unpalatable, he must not assume that his patient will find it so. A physician may be unduly sensitive to strawberries, and following its ingestion acquire an urticarial rash. It does not, however, necessarily follow that this will also apply to his patient. The incontestable fact is that strawberries form a delightful and palatable food for the majority of people. This analogy applies equally to alcohol and the moral aspects afford no exception. In proof of this, I can do no better than cite as an example the conduct of some of your teachers. These men, whom we all know, command the highest respect from their fellow-men—lay and medical—and with them the personal use of alcohol is a moral issue; but we know that none of them ever hesitates to prescribe alcohol when, according to his judgment, it may do good. You may, in time, forget much of the details of the chemistry and physics which you were taught, but you have learned much if you have been permanently impressed with the importance of experiment and intellectual honesty; of putting theories to the test by accurate observation; accurately recording your observations; and assorting data so that you may not only arrive at proper conclusions but that you may afford others an equal opportunity of testing them. “Long experience with experimental work has taught me that a somewhat rough and ready, but on the whole dependable, rule is that any natural phenomenon which, in advance of observation of the event, can be proved by purely logical processes to be necessarily so, almost invariably turns out upon real competent and penetrating trial or observation to be in fact not so at all but quite otherwise.” (Raymond Pearl: “The Biology of Population Growth”). The final appeal is to experiment. What, therefore, are the experimental facts with respect to the action of alcohol on man?

Let us first consider this question—is alcohol a foreign substance, as far as the human body is concerned? Is it, like lead, a substance which serves no useful purpose, and which the body is not meant to deal with either in health or in disease? The reply to this question had to wait for development of methods for the detection and quantitative estimation of minute quantities of alcohol in biological material. These methods are now available, and from experience with these methods the reply to this question is defi-

nately—No. Results of very exact methods of analysis indicate that alcohol is a normal constituent of the human body. It is found in the total abstainer from alcohol as well as in the alcoholic and is present in practically every body tissue. In the blood it is found in amounts somewhat similar to uric acid—approximately 4 mgrm. per 100 cubic centimetres, but it differs from uric acid in that it is not a waste product; it is an *intermediate product* of metabolism. An appreciable part of it has its origin in the gastro-intestinal tract, owing to the action of the colon group of bacilli on sugar, but there is reason to believe that it is also formed elsewhere in the body; and, as an intermediate product, it can be, and is, utilized by the body.

Because alcohol is a normal constituent of the human body, it does not necessarily follow that it may not at times be harmful. Copper is a normal constituent of the body, and we have reason to believe that this element may be harmful when present in excess. Copper is classified as a poison in all text-books of toxicology. Therefore, can alcohol, at any time, act as a poison?

The reply to this question depends upon the definition of a poison. Definitions are at all times difficult and alcohol affords no exception. Taylor defines a poison as a substance which when absorbed into the blood is capable of seriously affecting health and of destroying life. If we accept this definition, as Glaister points out ("Medical Jurisprudence and Toxicology"), we exclude the mineral acids and alkalis, which do not kill by being absorbed into the blood but by rapid destruction of the parts of the gastro-intestinal tract with which they come in contact, or by secondary pathological changes affecting nourishment, such as the impairment of swallowing because of stenosis of the œsophagus, or the interference with digestion by destroying the gastro-intestinal mucosa. Letheby defines a poison as anything which otherwise than by the agency of heat or electricity is capable of destroying life, either by chemical action on the tissues of the living body, or by physiological action from absorption into the living system. Such a definition does not include uræmia, cholæmia and other conditions in which life is none the less certainly endangered. Both of these definitions, however, include alcohol. We are all familiar with the clinical picture of acute alcoholic intoxication—a condi-

tion characterized by gradual loss of function of the higher psychic centres, neuro-muscular incoordination, stupor, coma with subnormal temperature, stertorous breathing, cold and cyanotic skin, constricted pupils and, finally, death. All of us are also familiar with the picture of chronic alcoholic intoxication—the catarrh of the gastro-intestinal tract and degeneration of the central nervous system, with progressive loss of the intellectual powers. Alcohol, therefore, when taken *in excess* is a poison. It can, and does, cause bodily harm and no one can logically condone its excessive use. Drunkenness has been regarded as shameful from time immemorial.

Whether alcohol has, or has not, a place in man's economy cannot, and should not, logically, be judged by its action when taken in excess. Arsenic, strychnine and mercury are powerful poisons when taken in excess, but we know that each has a valuable place in medicine. Water is a poison when taken in excess! Water, ordinary or distilled, when taken in excess leads to the syndrome of "water intoxication"—headache, dizziness, restlessness, chills, vomiting, dyspnœa and muscular cramps. We are not here concerned with acute and chronic alcoholism. I shall confine my observations to the *moderate use* of alcohol only.

The difficulty of definition again arises. What is meant by the term "moderate"? Experiment has taught us that moderation cannot be defined in terms of grams or cubic centimetres per unit of body weight, nor per unit of time. The effects of a given quantity of alcohol differ not only in different individuals but in the same individual under different conditions. For example, alcohol when given with food has a different effect than when an equal quantity is taken without food. When taken in concentrated form its effects are different than when it is diluted. Sex appears to be a factor also. Alcoholism, for example, is about six times more frequent among males than among females; but it is a remarkable fact that the great majority—about 70 per cent—of cases of Korsakoff's syndrome are met with in females. (Draper: "Diseases and the Man"). To add to these variables there is the fact that repeated use of alcohol leads to improvement of tolerance. This applies to animal and man. Whether this increase of tolerance is more apparent than real and is due merely to defective absorption from



the gastro-intestinal tract, or whether it is real and due to accelerated oxidation is problematical. The fact remains that with increased use, the quantities necessary to produce the same effect upon the central nervous system become progressively greater.

As before stated, alcohol is a normal constituent of the human body. It is an intermediate product of metabolism and can be utilized as it is in many lower organisms. It is a food, a food being anything which is palatable or which is capable of being made palatable, which can be absorbed by the gastro-intestinal tract when taken by mouth, and when absorbed is capable of yielding energy. Administration up to 3 or 6 c.c. of alcohol in all experiments in which mechanical work was done reduced by 8 to 15 per cent the number of calories required to do severe work. Rapidity of recuperation after fatigue was promoted (Simonson). Whether it improves the recovery process in muscle or acts on the contractility of muscle so that the amount of work per gram of lactic acid produced is increased is not known. As the late Graham Lusk observed ("Science of Nutrition"), the latter view would fit, or at least would not be out of line with, the Hill-Meyeroff theory.

Alcohol, like carbohydrate, can spare body proteins and, as a food, has one advantage over all foods, carbohydrate, fat and protein, in that it appears to exert little or no specific dynamic action. Experiments indicate that the specific dynamic action of a mixture of alcohol and glucose is practically that of glucose alone. Its ability to spare body proteins and its peculiar specific dynamic action should make it an ideal food under certain conditions in disease when used intelligently. Like glucose, it has an advantage over other foods, in that, prior to its utilization, no digestion is necessary. It is also readily absorbed from the gastro-intestinal mucosa and is one of the very few substances absorbed by the mucous membrane of the stomach. Alcohol is also readily oxidized (oxidation may be detected within a few minutes after ingestion) and its end-products do not appreciably increase the work of the excretory organs; carbon dioxide is lost largely by the lungs, and water, in addition to being excreted by the kidneys, also leaves the body by the skin, the lungs and the intestines. Even that portion which must be excreted by the kidneys accounts

for very little added work, for it has been clearly demonstrated that, though the kidneys must do a large amount of work in excreting urea, salt, and other constituents of urine, the amount done in excreting water alone is relatively very small.

Respiratory-quotient studies indicate the ease with which the human body can utilize alcohol. There is evidence of oxidation within a very few minutes after its ingestion. The body will, apparently, use alcohol in preference to any other food; regardless of the type of food in the stomach during an experiment, when alcohol is added, the respiratory quotient decreases rapidly, indicating a preference for the alcohol. Alcohol, when used intelligently, can affect the nutrition favourably because of properties other than its food value. It does not improve, nor does it impair, the utilization of carbohydrate, fat and protein, but it can aid nutrition indirectly by its irritant action upon the mucous membrane of the stomach; it promotes gastric secretion. This secretion differs from the normal, as a rule, in that though it may contain the usual quantities of hydrochloric acid, it may contain little or no pepsin. The secretion, however, does not lack the property of improving appetite. It should, therefore, theoretically, and does practically, tend to counteract loss of appetite, especially in elderly persons and in wasting diseases. Its irritant action is not confined to the stomach, for it stimulates secretion of the small intestine (Chittenden) and also that of the large bowel (Radzokowski).

The human body oxidizes alcohol at a limited rate only. However, when taken in moderate quantities, very little escapes oxidation, that is, very little (approximately less than 5 per cent) is excreted by the skin, lungs and kidneys. A little more may be excreted by the kidney during diuresis. Since the rate of oxidation is limited, and since alcohol is rapidly absorbed and diffuses fairly evenly throughout the body tissues, when the amount taken is such that the rate of oxidation cannot keep pace with the rate of absorption from the gastro-intestinal tract the alcohol accumulates in the blood, reaches the central nervous system rapidly and here it exerts its most marked effects. In general, there is some relationship between its concentration in the blood and its effects upon the nervous system. Alcohol is not a stimulant, but as D. R. Hyman well put it, its action is an "inhibition of inhibitions". It diminishes

sensitivity to stimuli. It is a depressant and acts as such in all concentrations, and by doing so interferes with work of precision, mental or physical. Though this may not be a desirable attribute in most cases in health, it is very desirable at times in disease, for by calming the highest centre by diminishing the acuteness of sensory perception, it affords relaxation; in illness, it removes the worry and anxiety which, as Starling put it, "often militate against recovery." It promotes sleep. Every physician knows the importance of sleep at times, but it is not always readily attainable. For this reason, we never hesitate to use morphine when conditions demand it. There is, therefore, no logic in withholding alcohol, when it can serve the same purpose. There is, as a matter of fact, more reason for giving it, for, in addition to affording sleep, it supplies food.

Alcohol is rarely used, and is still more rarely required, as a food in healthy people. Healthy people use alcohol chiefly because of its effects upon the central nervous system; and here we find the greatest controversy as to its desirability. The mere fact that alcohol is not used primarily as a food does not necessarily imply it is of no value otherwise. No one, I venture to say, will minimize the importance of mental relaxation; to make life worth living, we also need conviviality. As McCurdy puts it, "conviviality is more important for the maintenance of mental stability and effectiveness than is realized." In many persons these are obtained most effectively by the cocktail before dinner or the whiskey and soda or wine or beer after. When taken in moderate quantities, these beverages have an effect on some people out of all proportion to their food value.

One of the immediate effects of alcohol is that it interferes with work of precision—mental and physical. No one could, therefore, logically defend its use during the day, when duties demand efficiency; but if, after a day of much work and worry, the cocktail, wine, whiskey and soda, or beer is found by some to afford the necessary relaxation which others attain otherwise, is an amount of alcohol necessary to attain this relaxation justifiable, providing it is such that it does not impair one's efficiency the following day? Some authorities in medicine approve of it as an aid to digestion. It is a well recognized fact that gastric secretion may be greatly influenced by psychic disturbances

such as worry. Disturbances of secretion lead to disturbances of digestion; worry causes loss of appetite. Food is then taken, not because of hunger, but because of the hour for the meal. As the food is not relished, it is eaten rapidly; it is bolted; and though the harmful effects of such practice may not be observed immediately, they are nevertheless real and sooner or later may lead to a train of signs and symptoms without any apparent organic lesion. By calming the higher centres, food is eaten more slowly; it is enjoyed more thoroughly, and, thus, exerts its effects most beneficially. Amongst the many theories of the etiology of peptic ulcer, that which has as its basis irregular diet has not the least number of adherents; it is a remarkable fact that peptic ulcers are uncommon in the mentally sluggish and imperturbable individual. The picture is not entirely clear; but there is much to support the judicious use of alcohol in many of such cases.

Alcohol, like all other foods and therapeutic agents, may be beneficial for one condition but harmful otherwise, and many attempts have been made to determine whether alcohol is harmful when taken in moderate quantities. There are the findings of the pathologist; mortality and morbidity data; studies in eugenics; observations on the relationship between alcohol and insanity; and studies of the influence of alcohol upon social behaviour in general. I shall attempt to summarize the findings as briefly as possible.

From a true pharmacological standpoint, and from the point of view of pathological anatomy, alcohol, when taken in moderate quantities, appears to have no appreciable effect upon any organ other than the brain. Its habitual use in such amounts by normal persons appears to be without any permanent deleterious organic effect. As time goes on and more facts are gathered, there is less and less evidence to show that, even with the use of excess quantities, the degenerative changes ascribed to alcohol in the past are actually due to it, except as regards the brain and the stomach. If data which suggest otherwise are accepted without reservation, there are other data which when also accepted without reservation afford equally "good" proof that alcohol may be beneficial. For example, opposed to the evidence that alcohol causes cirrhosis of the liver, there is equally good reason to suspect that alcohol may

have a favourable influence on the biliary passages, in that it may prevent precipitation of cholesterol and thus prevent gall-stone formation. Post-mortem and clinical records indicate that gall stones are very uncommon amongst alcoholics. If this low incidence is due to the solvent action of the alcohol on cholesterol, and if cholesterol plays an appreciable part in the production of arteriosclerosis, as many authors now believe, it is, as Leary points out ("The Therapeutic Value of Alcohol") not unreasonable to suppose that the moderate use of alcohol may also prevent arteriosclerosis; and it may here be observed that many more people die of gall bladder disease and arteriosclerosis than of cirrhosis and alcoholic insanity combined. I am not suggesting alcohol for the prevention of gall stones and arteriosclerosis. I cite these examples merely to emphasize the complexity of the problem; the difficulty of evaluating the data, and the importance of intellectual honesty in expressing opinions.

Though duration of life is the most simple and direct measure of the influence of any particular disease upon mortality, there are many variables which must be considered in the interpretation of mortalities. Data which merely relate crude death rates with consumption of alcohol per capita, or which compare crude death rates of total abstainers with those of non-abstainers are isolated statements of fact with very limited significance. The following Chart

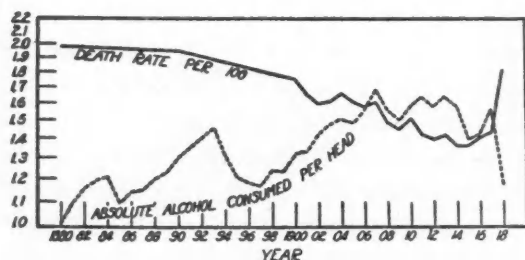


CHART 2.—Comparison of consumption of absolute alcohol per head of population, and crude death-rate per 100 population in the United States Registration Area.

is reproduced from Raymond Pearl's "Alcohol and Mortality" and it clearly demonstrates the weakness of all such crude statistical comparisons as these. According to Pearl,

"Up to 1906 the consumption of alcohol steadily rose, and the death-rate just as definitely declined. From 1906 on till the epidemic year, 1918, the two curves ran a course suggesting, but not very closely fulfilling, a condition of parallelism. In 1918 the alcohol consumption abruptly dropped, as a result of war-time prohibition, and the mortality rate shot up,

as a result of the influenza pandemic. This last year really exposes beautifully the essential weakness, from a scientific viewpoint, of all such crude statistical comparisons such as these. In this particular year, we know definitely why the two curves took the course they did, and we know, furthermore, that unless one is prepared to maintain that the war-time prohibitory legislation was the cause of the influenza epidemic, or on the other hand, that the epidemic was the cause of the statutes (passed, by the way, sometime before the outbreak of the influenza) we will be forced to the conclusion that there is no causal connection between the movements of alcohol consumption and mortality in this particular year."

Since then, there has been a general decrease of death rates in the United States, but this can hardly be attributed to any beneficial effects of legislation against alcohol. Firstly, if we are to believe published reports, the measures taken to prevent the use of alcohol have not been very effective. Secondly, the mortality data clearly indicate that the improvement in death rates is appreciably accounted for by decreased death rates amongst children; and, lastly, the improvement is not confined to the United States; it is also seen in the reports of countries where legislation for the prohibition of alcohol does not exist.

Age, sex, race, occupation and environment are some of the many factors which influence mortalities, and there is the problem of longevity. Longevity is determined in a considerable measure by heredity. This holds whether we deal with fruit flies, guinea pigs or human beings; length of life has been shown to be a definite family characteristic. Therefore, if duration of life is inherited, it is well, as Raymond Pearl points out, "in drawing conclusions to be sure that in the two groups—abstainers and moderate drinkers—that they are alike—genetically homogeneous—in respect to this attribute of longevity." It would obviously be an error to compare a group of total abstainers who have inherited a long duration of life with a group of moderate drinkers who have inherited a short duration of life.

Longevity is related to the greater question of inheritance of, or susceptibility to, disease. With few exceptions, we all die, not of gradual disintegration of the body, but of some definite disease. Death amongst the young is largely due to infection, and in old age to nephritis, heart, blood-vessel disease and cancer. If we were all short-lived, arteriosclerosis and cancer would be practically unknown. Many who write on cancer and repeatedly emphasize the increasing incidence of this disease overlook this fact.



With the control of disease which kills the young, it is reasonable that more people will reach the age at which arteriosclerosis and cancer are prevalent. In 1854, the expectation of life at birth in England and Wales for males was 39.9 years and for females it was 41.8 years; whereas, in 1922, the corresponding figures were 55.6 and 59.6 years. In 1868, the population death rate for England and Wales was 20.6 per 1,000; whereas, in 1929, 60 years later, it was 11.7. (From E. V. Cowdry: "Human Biology and Social Welfare"). I mention England and Wales, because legislation for the prohibition of alcoholic beverages is not an influencing factor. This improvement in duration of life is largely due to progress in bacteriology and public health measures in the control of pestilence. We are all familiar with the advances in medicine with respect to smallpox, malaria and syphilis; with the preventive vaccines against typhoid and paratyphoid fever; the protective sera for tetanus and scarlet fever; the curative measures for cerebrospinal fever and pneumonia, and the more recent measures of immunization against diphtheria. To make full use of these advances, there are the International Health organizations, school medical services, infant welfare organizations, and the publicity with respect to the value of periodic health examination. When we allow for all of these factors which influence mortality, though isolated data may suggest otherwise, the consensus of data indicates that though excessive use of alcohol definitely increases mortality, moderate quantities are physiologically harmless in the large majority of individuals.

Nor does alcohol, when used in moderate quantities, appear to affect morbidity. In support of this view, I quote the carefully collected data of G. B. Wallace and those of Langmead and Hunt, with reference to the influence of alcohol upon resistance to infection (Emerson: "Alcohol and Man"). These investigations lead to the conclusion that alcohol in "moderate or therapeutic" amounts has little or no direct effect. It may confer no specific benefit, but it also imparts no specific liability.

Insanity has often been attributed to alcohol. As with all other phases of the problem of alcohol, very little investigation is necessary before we meet with data from which diametrically opposite conclusions may be drawn. As an example, I cite a very careful investigation of

the relationship between alcohol, syphilis and insanity. In 1897, Sir Frederick W. Mott was appointed as pathologist to the London County Council Asylums for the purpose of investigating the causes of insanity, and, as he puts it, his attention was immediately attracted to the assigned causes of mental disease. They did not fit with his former experiences as hospital physician. A very considerable portion of cases were attributed to alcohol, whereas, syphilis as a cause was hardly recognized. As a result of his investigation, however, he was able to show that the reverse was the case, for all the cases of general paralysis, a large portion of the cases of organic brain disease, and a number of cases of congenital imbecility were due to syphilis, but the cases in which alcohol was *per se* the cause of insanity were in proportion to the total population of the asylums relatively few. Opposed to this view of Sir Frederick Mott there is a statement that about 20 per cent of admissions to asylums are directly or indirectly due to alcohol, and the recent conclusions of H. M. Pollock, of the New York State Department of Mental Hygiene. Pollock regards alcohol as "the direct and principal cause of several types of mental disease" and does not associate the drink habit in the majority of individuals with any previously existent constitutional inferiority or abnormal mental state.

If insanity is due to alcohol, it should be most pronounced amongst individuals who are exposed to excessive quantities. Practically all of the available data, however, tend to suggest otherwise. Alcohol may aggravate an existing insanity, but it does not appear to be a primary factor. The histories of such individuals, when carefully obtained and interpreted, tend in general to point in one direction. For example, according to the experiences of Barrington and Pearson, it was want of will-power and self-control associated with mental defectiveness which preceded the alcoholism. This fits with Branthwaite's experiences in inebriate reformatories: "the majority of insane inebriates have become alcoholic because of congenital defects or tendency to insanity, not insane as a result of alcoholism, and the drunkenness which preceded alcoholic insanity was merely the herald—the only obvious sign—of incipient mental disorder. In relation to the final insanity, drunkenness in such cases is the intensifier per-

haps, but not the cause of the disease." The dominant factor in inebriates appears to be an underlying nervous and mental instability; as Rogers put it "something that fails them in time of stress, worry and storm." A diversity of experiences support this statement. The statistics of admissions to the London asylums for 12 years, post-mortem records of hospitals and asylums, and experiences of inebriate colonies, all, according to Sir Frederick W. Mott, bear witness to the fact that alcohol plays a relatively unimportant part in production of certified insanity; "All the evidence, however, indisputably tends to show that persons with an inborn neuropathic or psychopathic tendency, therefore having a narrow physiological margin of self-control, either due to an inborn deficiency of the highest evolutionary level of the brain, or a functional instability of it, become anti-social by quantities of alcohol which would have no effect on the normal individual." To put it briefly, the consensus of data suggests it is not the alcoholic who become insane but the insane who become alcoholic.

Many see in alcohol the ultimate degeneration of the human race, for it is not only affecting the present generation, but will affect the future also, as alcoholism is transmitted from father to son. There is very little foundation for this idea. Firstly, the majority of people who do take alcohol do so in moderate quantities only and, as stated, there is no proof that it does harm under these conditions. Secondly, there is no proof that alcoholism is inherited. What appears to be transmitted is not the alcoholism, but the disposition of character which may lead to it. Degeneracy has also been predicted from effects of alcohol upon germ cells, but the difficulties in the interpretation of the data are many. By far the greater amount of experimental data applies to animals, and it is not always simple to argue from animal to man. Rabbits, for example, can live on the leaves of belladonna, hyoscyamus and stramonium; pigeons are relatively insusceptible to morphine; and it is almost impossible to poison the hedgehog with opium, cyanides, arsenic and bichloride of mercury. This animal is also almost immune to cantharides. All carefully conducted experiments in animals, however, appear to indicate a balance between the evil and the good effects of excess alcohol; loss of fertility which tends to decrease population is balanced by increased

vigour of those which survive—a balance, the result of selective annihilation of the less resistant.

Assuming that one may argue from animal to man in the case of alcohol, an important fact repeatedly overlooked is that, in many of the experiments quoted, the animals tested were exposed to amounts of alcohol which, when calculated on the basis of grams per kilogram, would in man be incompatible with life. Such amounts would cause death almost immediately from acute alcoholic intoxication. In other instances, the amounts, though not necessarily fatal, were more than are met with even in the most advanced inebriate. Our present concern is the effects of moderate quantities only, and it is highly improbable, as Stockard put it, that the quality of the human stock has been injured or adversely affected by the long use of such quantities.

As further evidence of degeneration of the human race there are quoted, in addition to the high infant mortality amongst alcoholics, the high incidence of convulsions as a cause of death, the high fetal mortality, and the high death rate among grown-up children. Again, we are not concerned with chronic alcoholism, but these data are of interest here in that they afford examples of the errors of dogmatism. The data are incontestable; it is the interpretation which is faulty. Impressions are not verified facts, and when impressions lead to generalizations confusion is bound to follow. There is no doubt of the high mortalities nor of the convulsions; but there is much doubt of the fundamental pathology. The high incidence of convulsions, for example, is not necessarily due to a congenital defect of the central nervous system. It may be due to the action of alcohol on a normal brain. It is a well known fact that the maternal milk of an alcoholic may, during an alcoholic bout, contain sufficient quantities of alcohol to cause convulsions in a perfectly normal nursing and cause immediate death from acute intoxication. This applies to animal and man. Very suggestive that this is the cause of the convulsions and death, rather than an inherent defect of the brain, is the fact repeatedly noted that when such infants were fed other milk, the convulsions disappeared. Both placenta and amniotic fluid have been found to contain appreciable quantities of alcohol in animals and man during exposure to excess of alcohol. This

could, also, readily explain the high infant mortality. It is not necessary to assume some defect of the germ cell.

Nor are the high morbidity and mortality rates amongst grown-up children of alcoholic parents readily explained by congenital defects. A careful analysis of the data shows that there is more reason to believe that the mortalities and morbidities of such children are due to the environmental conditions to which such children are generally exposed, namely, neglect. Here, we have a problem for the eugenicist, and alcohol may assist him in his quest. To quote from a report of a recent meeting of eugenicists, "Eugenics aims at the prevention of propagation of the unfit and the encouragement of propagation of the fit." This definition is, of course, incomplete, and it is such definitions which tend to antagonize the average person against this branch of human endeavour. Etymologically, this definition may be correct, since the term eugenics has its origin in the Greek word meaning "well born"; but, to quote Sir Francis Galton, founder of this science, "Eugenics is the study of the agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally." Eugenics has its sociological as well as its biological aspects; there are the problems of nature and those of nurture. As the late Sir J. Arthur Thomson put it, "Nature and nurture are the two components determining the development of character. . . . all our features and characters of mind and body, are the resultant of the two components, both of which are necessary." The concept of eugenics is ideal, and there is a material basis for the encouragement of this branch of science.

Though there is no reason to believe that alcoholism is transmitted from father to son, mental defectiveness (a condition which leads to alcoholism) is subject to the laws of inheritance. Hereditary feeble-mindedness acts as a Mendelian recessive, and certain insanities behave as Mendelian dominants; and the number of such defectives does not appear to be inappreciable. In his human "Eugenics", Guyer ("Our Present Knowledge of Heredity"—The Mayo Foundation Lectures) records the observation that 30 to 60 per cent of the criminals, and probably more than half of the drunkards in his country (United States) were mentally unstable or deficient to begin with, and he states

that in tests to determine what each individual was best fitted to do as his part in the late war it was found that 47.3 per cent of white recruits in the United States Army were graded below the mental age of 13 years, in spite of the fact that "unquestionably the army possessed a higher average intelligence than would be found among the same number of individuals taken at random from our population, because obviously feeble-minded and those who were otherwise mentally defective had already been weeded out. . . ." There is, therefore, as stated, a material as well as an ideal basis for the practice of eugenics. There is, however, as yet, much need of scientific caution. The science of eugenics is still much in the stage of compiling statistical data and discovering and coordinating facts of the laws of heredity. The practice of sterilization of the "unfit", now a state measure in a number of places, is, to say the least, bold; for, in the final analysis, the crux of the problem is—Who is to be the arbiter of fitness? As this problem is, as yet, far from solution, the unrestricted use of alcohol may, as stated, be a practical measure—a measure certainly less bold than sterilization. To quote Sir Frederick Mott, "if small amounts of alcohol become a test of control, free use of alcoholic beverages may serve as a means of eliminating these poor types by making such persons anti-social and thus causing their segregation in asylums, mentally deficient institutions and prisons. They are thus excluded from society."

Haldane's views are somewhat in line with this thought. This biologist's idea of a rational program for the eugenicist is to teach voluntary eugenics by all means; but if the desire is to check increase of any population or section of a population either massacre it or force upon it the greatest amount of liberty. Freedom of action is undoubtedly more sound biologically than restriction. Nurture may help to improve the individual, but it can do very little if natural conditions are unsuited. The final issue depends largely upon the endowment the individual has to start with. As Guyer puts it, heredity determines what one can become; environment and training supply, in the main, the means of becoming it; and legislation against alcohol is not very effective in the poorly integrated individual. Experiences indicate that the narrow physiological margin of control of these individuals is not confined to alcohol, for



such individuals, deprived of it, take to other excesses when opportunities present themselves and, in a very short time, many of these opportunities will be much more difficult to control than the consumption of alcohol. Only a few years ago, a Bavarian chemist discovered how to synthesize cocaine from coal-tar products. Any one with a knowledge of chemical technique and familiar with the literature can produce enough of this drug to defeat legislation.

Sound as these suggestions may be biologically, we, as physicians, cannot apply them in practice. Medicine and eugenics are incompatible; the physician to be consistent with his Oath can be no partner to the exposure of the individual to the rigors of natural selection—"I will follow that system of regimen," he promises, "which, according to my ability and judgment, I consider for the benefit of my patients and abstain from whatever is deleterious or mischievous." The physician is interested in the individual; the biologist in the group.

I have not dealt, nor do I propose to deal, with many of the sociological aspects of alcohol. Though we may be interested in this phase of the subject as ordinary citizens, we are not particularly concerned as physicians. Here, as in the problems of medicine, we find an abundance of facts difficult to evaluate and, for this reason, an abundance of theories in not a few of which one readily recognizes admixtures of politics, self and other interests, rather than an attempt to find the truth. I cite, as an example, the relationship between alcohol and crime. In "Alcohol and Man" Herman Adler deals with this subject and, because of clarity of exposition, I can do no better than quote his summary verbatim.

"We now believe that the hope of finding specific causes of any of the major behavior disorders, such as crime and delinquency, is likely to be a futile one. If one regards social behavior as a complicated reaction between the human being and his environment, as a sort of very intricate balancing act, it becomes evident that this balance may be upset in many ways. The forces which result in an overthrow of the equilibrium may operate from without or from within; the result is dependent not upon what the force is or whence it comes, but upon a great number of coincidences, most of which have no direct connection with the particular act. Under such conditions, it is, of course, clear that any chemical re-agent which disturbs the smooth functioning of the organism may produce situations from which a criminal act may result. It is this disturbance of functioning so commonly associated with alcohol which has perhaps contributed more than anything else to the widespread belief that alcohol is one of the great causes of crime."

In the introduction of his paper on "The Use of Alcohol in Medical Practice" (*J. Am. M. Ass.*, 1925, 85: 577), Roger I. Lee reminds us of an old saying that alcohol is a highly inflammable substance whether you apply a match or a word to it. The truth of this observation must now be obvious, though, because of the variety of matter, my observations had to be rather fragmentary. However, if I have accomplished nothing else but impressed you with the fact that there are many sides to the story, I shall have accomplished much of which I had in mind. You will have observed that the literature of alcohol affords a variety of reading, as it includes practically every branch of science. It is, therefore, not only interesting but instructive. It is worthy of pursuit and I recommend it to you, for it emphasizes the truth of an old adage. "Above all things study. Whether for the sake of learning or for any other reason, study. For, whatever the motives that impel you at first, you will very soon love study for its own sake." To impress this adage upon you was the chief object of this address.

**FETISH OF TRIPLY DISTILLED WATER.**—In a study by William J. Elser and Ralph G. Stillman, New York, over a period of four years and three months, no chill has followed the introduction of physiologic solution of sodium chloride into the veins of patients at their hospital. This solution was made with New York City tap water freshly distilled once, in a Barnstead still run by steam and operated during a large part of the period at the full capacity of the apparatus. This experience demonstrates with certainty that singly distilled water can be used with safety in the preparation of solutions

for intravenous administration and that "triply distilled water" is truly a "fetish" in that it is a "material object regarded with awe, as having mysterious powers residing in it . . . and from which supernatural aid is to be expected." The authors conclude that the use of freshly (and properly) distilled water in the preparation of solutions for intravenous administration is essential. Solutions introduced directly into the circulation, other than physiologic solution of sodium chloride, should be administered at a rate not to exceed 5 c.c. per minute.—*J. Am. M. Ass.*, April 29, 1933.

# THE FRIEDMAN MODIFICATION OF THE ASCHHEIM-ZONDEK TEST FOR THE DIAGNOSIS OF PREGNANCY

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IN 1930 an investigation was begun in this department to determine the accuracy and usefulness of the Aschheim-Zondek test as an aid in the diagnosis of pregnancy. Concurrently, Dr. Ettinger was carrying on a similar study at Queen's University. A joint report from the two laboratories, giving results on 112 cases in which mice were used as the test animals, was published in this *Journal*.<sup>1</sup> The Friedman modification of the Aschheim-Zondek test<sup>2</sup> utilizes rabbits as test objects and the time required is approximately 30 hours, in contrast to five days when mice are used. After the publication of our previous report we performed a number of tests, using both rabbits and mice, and found excellent agreement in the results. The shorter period required for the rabbit test is an obvious advantage and, after the demonstration of its accuracy, rabbits were utilized in all further tests conducted in this laboratory.

In the initial phase of the investigation the object was to evaluate the test as a clinical aid. The service proved so valuable to physicians that it was considered advisable to place the test on a routine basis. Since funds were not available for the purpose it was necessary to charge for the service. At first the test was utilized only by physicians in Toronto, but it was later made available to any physician in Ontario. The laboratory staff has, up to the present time, examined urine from 1,600 patients. Tests have been performed only at the request of a physician and the result has always been transmitted directly to the physician.

The procedure used and the physiological mechanism involved have been adequately described by many authors. In this laboratory two rabbits are used for each test. The sample should be the first morning specimen. On the afternoon of the first day and on the morning of the second day the rabbits are given 8 c.c. of urine intravenously. On the morning of the third day the rabbits are killed and the ovaries

examined macroscopically. One or more corpora hæmorrhagica are considered to indicate a positive result. When the report is forwarded to the physician a form letter is used in which certain clinical information is requested. It was hoped that with the physicians' cooperation it would be possible to accumulate extensive data on the accuracy and usefulness of the test. In approximately half the total number of reports the physician has supplied the required information.

A summary has been prepared showing results in 538 tests, *i.e.*, those in which we have clinical information indicating the accuracy of the laboratory test. At the time of preparation of this summary, 1,536 tests had been performed. Of these, 407 had been carried out on mice, or on mice and rabbits. Of the balance, 1,129, clinical information is not available for 591. Results on the remaining 538 are as follows:

TABLE

<i>Laboratory Test Positive</i> .....		251
Clinical diagnosis	Pregnant	{ unstated period ... 98
		{ 3 - 9 months ..... 16
		{ 8 - 12 weeks ..... 22
		{ 4 - 8 " ..... 54
		{ 0 - 4 " ..... 48
	Not pregnant	{ ectopic ..... 3
		{ incomplete abortion 3
		{ missed abortion ... 1
		{ hydatidiform mole.. 2
		{ errors ..... 4
		251
Percentage error on positive laboratory tests .....		1.6
<i>Laboratory Test Negative</i> .....		287
Clinical diagnosis	Not pregnant	{ .....274
		{ ectopic ..... 3
	Pregnant	{ dead ovum ..... 2
		{ no missed period... 2
		{ errors ..... 6
Percentage error on negative laboratory tests.....		2.1

It is interesting to note the large number of tests which have been conducted on urine samples from patients less than eight weeks pregnant. Under these circumstances the lab-

oratory result is particularly useful. Although the accuracy in this series is similar to that reported by other workers, a discussion of discrepancies is in order. Since the test is positive when active placental tissue is present, the result should be positive in cases of ectopic pregnancy, hydatidiform mole, and in some cases of incomplete abortion. In the first group 9 cases of these types are included. We consider that the results of these tests should not be classed as errors. In the first group, however, there are 4 patients, definitely non-pregnant at a later date, in whom the test gave a positive reaction. In these the possibility may be considered that a very early miscarriage had not been detected. In the second group are 3 cases of ectopic pregnancy with negative results; these should possibly be classed as errors. In cases of dead ova, of which there were 2, one would expect the laboratory result to be negative, as was the case. There are 2 cases described as "no missed

period." In these cases the test was performed within a week after conception and before a menstrual period had been missed. In the second group are 6 patients with a negative laboratory result who were later shown to be pregnant. If the morning urine sample was not obtained, or if the sample were particularly dilute, an explanation might be available. The concentration of the ovary-stimulating material might be inadequate under these circumstances. If the 3 ectopic cases giving negative results are included the error on 538 cases is 2.4 per cent.

This report on the results of 538 cases confirms the finding of other workers and our previous conclusions on the accuracy of the physiological test for pregnancy.

Our thanks are extended to Mr. A. J. McEwen for expert technical assistance.

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### THE DANGER OF INCOMPLETE REMOVAL OF APPARENTLY INNOCENT TUMOURS\*

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WHEN the American Society for the Control of Cancer organized for its educational effort, I feared that it would be possible to educate the people faster in advance of the medical profession. For this reason I published a paper<sup>1</sup> read before the Medical Society of the Missouri Valley at Kansas City, on March 21, 1913, based upon the facts which I had accumulated in twenty years, showing the danger of incomplete operation in the early stage of cancer, and that incomplete operation was insufficient and often dangerous in the case of the benign tumour also. Some time ago I gave a clinic on this subject to the fourth-year students and was able to contrast two cases—one living nine years and the other dead of metastasis after nine years.

Each case gave evidence of the danger of the incomplete removal of an apparently innocent tumour, and also evidence suggesting what to do when the microscope reveals that the tumour has been incompletely removed, whether malignant or not.

The first case presented to the class was that of a woman about thirty years of age. The patient came under observation in the dispensary nine years before, because she felt a small nodule behind and below the internal malleolus. The nodule was diagnosed "ganglion." It was removed under local anæsthesia in the dispensary. The surgeon stated that he had enucleated and shelled the tumour out. It was smaller than a ten-cent piece. He was surprised to find a solid and not a cystic tumour, and he feared that he had incompletely removed it. It did not occur to him to use the cautery, and he did not think of post-operative irradiation. The gross tissue and the microscopic section clearly showed that a small bit of the tumour was torn off and probably had been left in the wound.

\* This paper was written on November 20, 1932, for the Bulletin of the American Society for the Control of Cancer, and appeared in that publication very much condensed. It is published here in the interests of the educational campaign conducted recently by the Ottawa Social Hygiene Council in connection with the Control of Cancer, which campaign was concluded by a public address by Doctor Bloodgood at the Chateau Laurier on March 30, 1933. (Ed.)



The sections showed a spindle-cell sarcoma, not the more common and benign giant-cell xanthomatous tumour of tendon-sheaths. The wound in this case was given deep x-ray therapy at intervals for more than a year, but a nodule almost the size of the original tumour remained in the scar. I decided to remove the scar and this nodule with the cautery. The nodule was a spindle-cell sarcoma, histologically identical with the original tumour. It was removed with a zone of uninfiltated scar tissue. To-day, eight years after the last operation, there is no loss of function and no recurrence.

The second case had to be presented by means of lantern slides, as the patient died of metastasis to the lungs about nine years after the first operation. In this instance there was a small subcutaneous tumour on the outer side of the upper third of the forearm. It may have been the size of a five-cent piece. The operator removed it on the diagnosis of a "fascial fibroma." He enucleated the mass. When the tissue was received in the laboratory, the gross specimen showed incomplete removal, which was confirmed by the section. The tumour was a spindle-cell sarcoma. Within two weeks after this operation, without preliminary irradiation, I excised the skin and soft-part scar down to the bone. Serial microscopic sections revealed no positive evidence of tumour tissue. Theoretically, it would be difficult to distinguish in young scar tissue between the spindle cells of a sarcoma and the fibroblasts in granulation tissue. Directly in the scar, within a few months, a tumour developed. The parents, discouraged by the results of two operations, tried a domestic remedy—white of egg. When I saw the patient again within one year, there was a fungous tumour the size of a silver dollar with, as the x-ray showed, no bone involvement. I removed this tumour with the cautery, giving it a wide margin, and saved the limb. In spite of the large scar, there was but little interference with function. The patient lived almost eight years after the second operation, showed clinical symptoms, and the x-ray picture of metastasis to the lungs on the tumour side, but no local recurrence.

The startling facts are that in tumours of the soft parts, benign and malignant, there have been recurrences in more than one-third of the cases. These recurrences, with few exceptions, follow incomplete operations—the "shelling

out" or "enucleation" of small and apparently innocent tumours. When the tumours were of longer duration and of greater size, the surgeon felt compelled to amputate or perform an extensive local dissection. The failure to cure this group was owing to *metastasis* and *not local recurrence*; there is a large number of permanent cures among the less malignant sarcomas.

Based upon this study, I have already in previous publications advised the irradiation of all epidermal, subcutaneous and deeper soft-part tumours, if their situation gives evidence that the most complete excision is not possible without injury to some important neighbouring structure. In larger tumours demanding more extensive excision, or even amputation, irradiation should be done first with the hope of reducing the size of the tumour and also to make a biopsy less dangerous. I have briefly considered these questions in the *Annals of Surgery*.<sup>2</sup>

To demonstrate that this problem is still with us, let me briefly give the data of two cases coming under my observation a few days before this clinic.

A woman physician, aged forty-seven, felt a small lump beneath the skin, between the periphery of the breast and the clavicle. It was so small that she had to point it out to the two physicians who examined her. It was watched for one month, during which time it grew very little. Then it was removed through a very small incision, and the section shows not only incomplete removal, but a carcinoma, and the question was asked:—What should be done—a very extensive local excision, with or without the complete operation for cancer of the breast, or irradiation first? Irradiation was decided upon and immediately given.

In the second case, there was a tumour the size of a five-cent piece in the region of the parotid below the lobe of the ear. It had been present but a few months. It was operated on under local anaesthesia and "shelled out." The section showed incomplete removal and a cellular mixed tumour of the parotid. Irradiation was instituted at once in this case.

The medical profession has never been properly taught the essential facts in the diagnosis and treatment of cancer in the earliest, most innocent, and most difficult stage to diagnose. It is impossible to find solutions for these various questions without having available, in connection with the great hospitals, the histori-

cal data, the actual tissues, and the ultimate results. There is no question, from my studies so far, that surgeons have been slow to realize the value of irradiation by x-rays and radium preliminary to operation; perhaps even greater before than after operation. The entire problem of biopsy, protected by pre- and post-biopsy irradiation, needs detailed investigation.

The object of this paper is to increase the

number of cancer students in the cancer clinics, in view of this knowledge as to the danger of incomplete removal of apparently innocent tumours, and to place before their careful consideration the indications for pre-operative irradiation and the safest methods of biopsy.

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### IRRADIATION THERAPY IN CANCER OF THE BREAST\*

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#### VIII.

WITH the progressive increase in cancer throughout all the countries of the world it is our duty to use every means available to prevent and overcome this disease. In the case of anyone who has taken the trouble to investigate, no doubt can be left in his mind that irradiation with either the roentgen rays or radium, or both, has a very definite value in overcoming malignant disease. In certain fields, this form of treatment has already shown itself of superior value. This applies especially to cancers of the skin, the mouth, and the uterus, and very definite advances have been made in cancer of the breast in conjunction with operation. Very definite advances have also been made in the treatment of cancer of the breast, primarily, as has been recommended by Keynes in London, and as has been shown by my own records. The matter of the irradiation treatment of cancer of the breast primarily, however, is still in the stage of investigation, and in my opinion its treatment for the present should be confined to the patients who cannot or will not be operated upon, or who are under observation in the larger clinics where they have the advantage of both surgical and radiological observations combined.

The value of irradiation in cancer of the breast has been demonstrated in the treatment of the inoperable and recurrent cases, and it is

because of the results obtained in this group of cases that we are gradually being called upon to treat earlier cases, and at times even the operable group. Probably the most convincing results have been shown in the post-operative and recurrent groups of cases, for here we have an indisputable diagnosis. In the post-operative group, the patient has been operated upon because of the very definite diagnosis of cancer on the part of the surgeon, and there has been opportunity for a definite microscopical diagnosis. If, then, recurrences take place there can be no question about the nature of the disease. Therefore, in this paper I shall confine myself to discussion of these two groups.

#### POST-OPERATIVE TREATMENT OF CANCER OF THE BREAST

In the report made by Buchholz, it was found that one-third (Portmann, 24 per cent) of the cases having complete operation (but not followed by irradiation) developed recurrence within the first year. These facts should be sufficient to indicate the desirability of instituting post-operative irradiation within the shortest time possible, which is usually within two weeks after operation. The average time at which our cases have reached us after operation has been four weeks. This high percentage of early recurrences should also give encouragement to those patients who have passed the first six months or a year. It is well known that the longer a patient goes without recurrence, the less likely there is to be any recurrence of the cancer.

\* Preceding articles in this series can be found in the *Journal* as follows:— 1932, 27: 521, 612; 1933, 28: 30, 182, 246, 392 and 521.

We formerly had set three years as the time limit at which recurrence was likely to take place, and this has now been increased to five years, which is accepted throughout the world as a time for the consideration of cure. However, we had one case that showed local recurrence which had been operated upon by the late Dr. W. W. Keen, and was brought to me by him for treatment of the recurrence eighteen years later. This was in a very old woman. The most striking fact, as is shown by the analysis of our cases, is that 64 per cent of the recurrences develop within the first year, and 42 per cent within the first six months (Ref.: Pfahler, *Am. J. Roentgenol. & Radium Therapy*, 1932, 27: 000). It is therefore especially urgent that, following an operation for cancer of the breast, the patient should return for observation at least once a month during the first six months, then once in two months, or, better, once a month for the entire year. We then try to follow our cases at long intervals during twenty-five years.

Post-operative treatment should begin as soon after the operation as is safe for the patient to be moved to the x-ray equipment, which is usually within ten days to two weeks. In our own records, the average time has been four weeks, which in my opinion is an unnecessary delay. Judged by past records, the surgeon should not assume the responsibility of not recommending post-operative irradiation, excepting in those cases in which the disease is absolutely limited to the breast tissue, and when he is quite sure all of it has been removed. Past records also show that it is extremely difficult to pass such judgment.

#### TECHNIQUE

It is our custom in the post-operative group to make use of low voltage x-rays only over the mammary and anterior mediastinal regions (130 KV., with 6 mm. of aluminum filter or its equivalent, at 40 cm. distance), and to give 25 per cent to 50 per cent doses over this area until 200 to 300 per cent of an erythema dose has been given, not exceeding "saturation value" at any time. For a second field, ordinarily we give treatment over the supra-clavicular and coracoid and anterior axillary regions with high voltage x-rays (200 KV.;  $\frac{1}{2}$  mm. of copper; 40 to 50 cm. distance), and in 50 to 80 per cent doses until 300 per cent (keeping within

saturation value) has been given anteriorly. We then give through the posterior axilla, with the arm thrown forward, a similar amount, and similar high voltage x-rays directed into the axilla, the deep tissues of the neck, and upper mediastinum. The exact plan must be modified considerably according to the build of the patient, the extent of the disease, and the type of operation which has been performed.

If the disease is well advanced and metastasis has taken place, it will probably also be advisable to give approximately at least 100 per cent, and better 200 per cent, through the posterior mediastinum, extending ordinarily from about the fourth dorsal to the second lumbar vertebra. These posterior doses should also be given with high voltage x-rays, but in my experience it is not practical to give more than 25 per cent doses. This, as you will see, involves a considerable amount of irradiation. It is my custom to take these various fields in serial order, which will prevent over-irradiation of the skin, but will give us a better continuous effect on the deeper tissues.

In an analysis of 1,022 private cases of cancer of the breast which were treated from 1902 to 1928, and reported before the Third International Congress of Radiology, July 26-31, 1931, at Paris, France, we had a total of 263 cases that received post-operative irradiation, and in the group of cases which had axillary glands involved at the time of the operation 58 per cent were well at the end of five years. *This is approximately two and a half times as many patients as remained well five years without post-operative irradiation in that type of case.* These facts alone show very definitely the value of post-operative irradiation, and the end-results indicate that the irradiation is of at least equal value to the operation itself.

#### THE TREATMENT OF RECURRENT CANCER OF THE BREAST

If the surgeon has not already referred the patient for post-operative treatment it certainly is his duty to see the patient once a month following his operation, and at the very first sign of any new growth there should be no delay in requesting treatment for the recurrence. In spite of these recommendations our records show that the average case was referred 22.7 months after the operation. At times the recurrence is allowed to continue for a considerable period



before the patient is referred for irradiation treatment.

In the management of recurrences, no general rule can be laid down, for one must deal with recurrences according to the conditions present, the location of the recurrence, the rate of growth, and the history of the extent of the disease at the time of the operation. In general, it seems advisable when one finds a local recurrence in the operative field, to use local applications of radium, if radium is available, for there radium exerts a more intensive biological action upon cancer tissue than can be obtained with the x-rays, when the radium can be brought into close proximity to the disease. When radium is not available, then in the operative field over the mammary region it is my custom to use low voltage x-rays, chiefly because high voltage x-rays are more likely to cause irradiation sickness, and perhaps, to cause some damage to the lung tissue. When such recurrences take place, one must simply limit the treatment

to the palpable disease, for it nearly always means also an involvement of the coracoid, axillary, and sometimes the supra-clavicular and mediastinal regions. Therefore, all of this area should receive some treatment.

We have treated 433 cases with recurrent carcinoma following operation. In the cases with only local palpable disease, 46 per cent were found well after five years, but if this disease was associated also with palpable disease in the axilla, and supra-clavicular region, then only 21 per cent were well at the end of five years. These facts show the importance of employing irradiation immediately after every operation, and it also shows very definitely the value of the treatment of recurrences.

If all the knowledge that is now available is utilized by the patient and the physicians it seems to me that we ought to raise our five-year recoveries to 75 per cent. This will require complete cooperation and thorough and skilful treatment.

#### FALL HAY FEVER POLLENS OF CANADA\*

By O. C. DURHAM,

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A THOROUGH search of the literature reveals very little information on the hay fever plants and pollens of Canada. Only one local survey has been reported. Detweiler and Hurst,<sup>1</sup> in 1930, reported a three-year study of the pollen content of the air in Toronto. They recognized three distinct seasons—the tree season, occurring from late March through May; the grass season, covering the months of June and July, and the ragweed season, occurring during late August and September. The proportion of tree pollen found was about half of the total pollen content of the air throughout the six-month period. The grass pollens constituted about 15 per cent of the total amount of pollen found and ragweed about one-third.

The only other information available is that secured from a study of the pollen slides exposed in six Canadian cities and three border cities of the United States during the years of 1929-1932.

\* From the Biological Laboratories of Abbott Laboratories.

Some of the results have appeared in my previous papers.<sup>2, 3, 4</sup>

#### METHOD

My investigations of the pollen content of the air in Canada during the fall have been made by means of daily pollen slides exposed by the observers of the Canadian Meteorological Service in each of the cities noted in this paper.† In each city the slides were exposed from August 10 until September 30. Careful counts were made of the pollen granules found on a unit area on each slide. Daily pollen figures are expressed in this paper in the calculated number of pollen granules per cubic yard of air, and seasonal figures represent the sum of the daily figures for each city. General comparisons are made with similar statistics for the United States (Figs. 1 and 2). I have had

† Grateful acknowledgment is herewith made of the valuable cooperation of Dr. J. Patterson, Director of the Canadian Meteorological Service, and local weather observers in making daily exposures of pollen slides.

opportunity to observe the hay fever flora only in southern Ontario in the region north of Lake Erie and in the vicinity of Toronto.

#### CONDITIONS INFLUENCING POLLEN PRODUCTION

Some of the factors influencing the kind and quantities of hay fever pollens in Canada are the presence of the Great Lakes, the large forest areas, the short growing season and the amount of summer rainfall. The Great Lakes act as a

THE RAGWEED SEASON  
Average for 1930-1931-1932

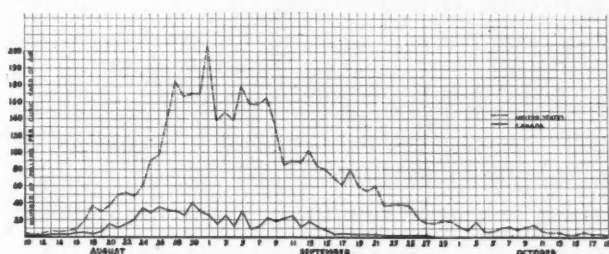


FIG. 1.—These curves are plotted from averages for three years in all Canadian and United States stations. It will be seen that the ragweed season is considerably shorter in Canada than in the United States.

#### COMPARATIVE POLLEN INCIDENCE IN CANADIAN AND BORDER CITIES



FIG. 2.—The comparisons in this graph are based on the total amount of all pollens found on the daily pollen slides during August and September. The results are for 1932, except in the case of Sault Ste. Marie (1929) and Prince Albert (1930). Ragweed is the principal offender in all places.

partial barrier to the pollen clouds driven north-eastward from the agricultural states to the south. The lakes also cause temperatures somewhat lower than the ideal for maximum ragweed growth. Hay fever weeds are, of course, absent from the large areas of uncultivated forested land north of the farming regions of Ontario and Quebec. Except in southern Ontario, the growing season is too short for ragweed. The amount of pollen which ragweeds will produce is much influenced by the size of the plants. In the vicinity of the Great Lakes the average height of ragweed plants is much less than in the United States. I have seen short ragweeds only an inch high in bloom near Lake Superior. This is, of course, exceptional, but contrasts

strongly with the average height of two feet attained by ragweeds in the corn belt of the United States. In Manitoba and Saskatchewan summer rainfall is not sufficient for normal ragweed development.

The accompanying weather map (Fig. 3) for August 29, 1931, shows ideal conditions for heavy ragweed pollen incidence in southern Ontario and Quebec. The strong counter-clockwise winds around the area of low barometric pressure above Lake Superior are loaded with pollen from the agricultural districts of the

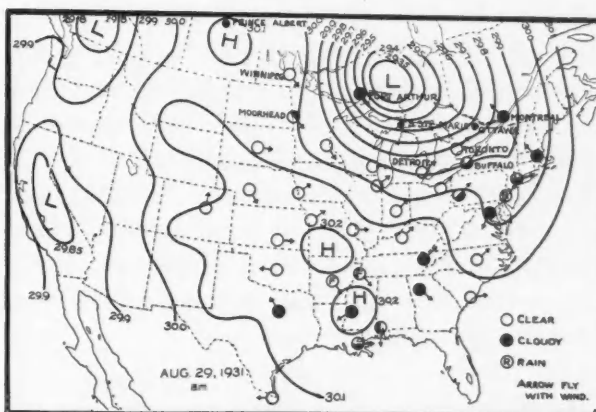


FIG. 3.—This map shows weather conditions on the day of highest pollen concentration during the year 1931. The isobars show barometric pressure. Strong prevailing southwest winds on the south edge of the storm centre carry heavy pollen clouds from central United States. On the west side of the storm area the winds are from the north and are pollen free.

United States and the extreme southern part of Ontario. Behind this area of low pressure in Manitoba and northern Minnesota northwest winds are almost entirely pollen-free. On days when a high pressure passes across the Great Lakes general wind directions are reversed. Then pollen-laden southeast winds blow into Manitoba from Minnesota.

#### THE RAGWEED AREA

Only the northern fringe of the great ragweed belt of North America lies in Canada. The exact limits of this area cannot be stated from the findings at these six stations, but from the fact that northwest winds in Ontario and Quebec are almost entirely free of ragweed pollen, it seems likely that the ragweed district in eastern Canada is a comparatively narrow area north of the Great Lakes and the St. Lawrence River. In the prairies of Manitoba and Saskatchewan the northern boundary probably lies within a hundred miles of the southern Canadian line.

## THE RAGWEED SEASON

Ragweeds begin to pollinate in all Canadian stations about the second week of August, but the quantities of pollen found on the slides are relatively small until the 20th of the month. Heaviest atmospheric contamination usually occurs just before the first of September—almost exactly the same time as in eastern and central United States. The exact day of this climax is more a matter of distribution of pollen than of its production, being determined by favourable high winds. The air is almost free from ragweed pollen after the 15th of September. Thus, possible contact with air-borne ragweed pollen may be had any time during August and September, but the active season lasts less than four weeks. Temperatures above 80 degrees are favourable to the ripening of ragweed pollen, but temperatures of 40 degrees have a marked retarding influence. Unseasonably cool weather lasting for a few days may terminate the season several weeks before frost.

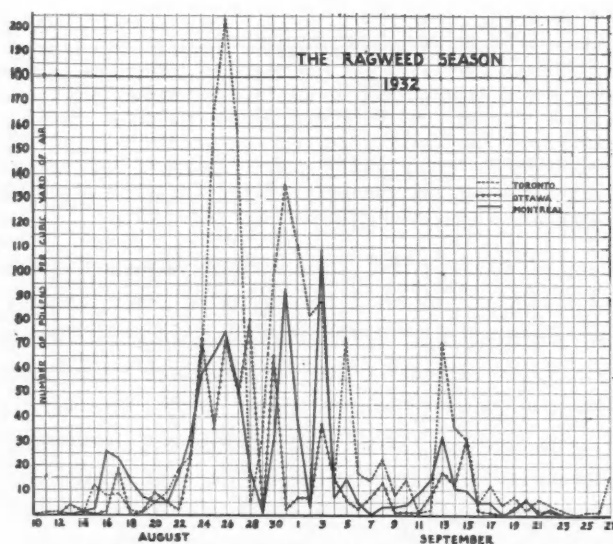


FIG. 4.—The daily fluctuations of ragweed pollen incidence caused by wind and weather are here shown in detail for the season of 1932.

## LOCAL COMMENT

**Quebec**—Slides have been exposed in Montreal during three seasons. The ragweed season here occurs about the same time as at Boston and the total amount of ragweed found averages about two-thirds as much as at Boston. As in the eastern United States, ragweed constitutes more than 96 per cent of the pollen content of the air during the fall season. Almost all of this comes from short ragweed (*Ambrosia elatior*). Giant ragweed (*Ambrosia trifida*) is rare. Conditions in other parts of Quebec are

not known, but it is likely that the ragweed pollen crop is heavier in the vicinity of Montreal than elsewhere in Quebec.

**Ontario**.—Four studies have been made in Toronto, two in Ottawa, two in Prince Albert, one on the American side at Sault Ste. Marie, four at Buffalo and three at Detroit. Ragweed incidence is probably greatest in the region of Windsor, where large amounts of pollen are produced by both short and giant ragweed and where no carrier prevents west winds from blowing heavy pollen clouds over from Michigan. More ragweed pollen is produced in the area immediately north of Lake Erie than in all the rest of Canada. Here short ragweed finds its best development, and south and west of London giant ragweed is fairly common. Studies at the border cities of Buffalo and Detroit reveal a pollen incidence five or ten times as great as that of any Canadian city. The pollen curve for Ottawa fluctuates much the same as for Montreal, as would be expected. Here the proportion of ragweed is 78 per cent, most of the remaining 22 per cent being produced by lamb's quarter (*Chenopodium album*) or related plants. At Toronto maximum concentrations occur on days of prevailing southwest winds and minimum concentrations on days with prevailing northwest winds. The fluctuations in the curve are almost the same as for Buffalo, but the amounts are only about one-eighth as much—more like New York City. It is possible that some of the pollen at Toronto is blown across Lake Ontario. The proportion of ragweed pollen at Toronto during the fall is 98 per cent. This agrees with the finding of Detweiler and Hurst.

At Sault Ste. Marie the amount of ragweed pollen found in 1929 was much less than in the agricultural parts of Michigan—about one-tenth that of Chicago or Detroit and one third of that of Toronto and only slightly above that of Port Arthur. The concentrations were high only with strong south winds.

The lowest figures in Ontario were obtained at Port Arthur, where only one day of severe concentration has been encountered in two years. On that day the local prevailing wind was from the northeast, but south of Lake Superior there were strong south winds. Thus, the possibility of upper air currents carrying pollen across Lake Superior is suggested. The suggestion is strengthened by the fact that the slide at Port



Arthur contained much pollen and no dirt, whereas land winds carrying local pollen usually have considerable dirt.

**Manitoba.**—The sharp difference in the amount of pollen encountered at Winnipeg compared with Moorhead, Minnesota, suggests some factor of greater consequence than the differences in rainfall and temperature. Average figures for Winnipeg are only about one-tenth as high as for Moorhead. Ragweed constitutes more than 70 per cent of the total pollen crop, with 20 per cent from Russian thistle (*Salsola pestifer*) and related plants. A few pollen granules of burweed marsh elder (*Iva xanthi-*

*Saskatchewan.*—Only six ragweed pollen granules were encountered during the whole fall season (1930) at Prince Albert, which is evidently beyond the practical boundary of the ragweed area. No doubt there is more pollen in the southern part of the province, but since concentrations are relatively low in Montana, the ragweed situation in Saskatchewan is not particularly interesting. Other pollens were not studied.

#### SUMMARY

1. Atmospheric pollen studies in six Canadian cities over a period of three years offer a useful means of learning the time, extent and severity of the ragweed season in Canada.

2. Low ragweed pollen incidence in Canada is accounted for in part by the presence of the Great Lakes, the large uncultivated areas, the short growing season, and in western Canada by insufficient moisture.

3. Short ragweed furnishes the bulk of the fall pollen crop in Canada with giant ragweed as a secondary factor only in the vicinity of Lake Erie and Russian thistle in western Canada.

THE RAGWEED SEASON 1932

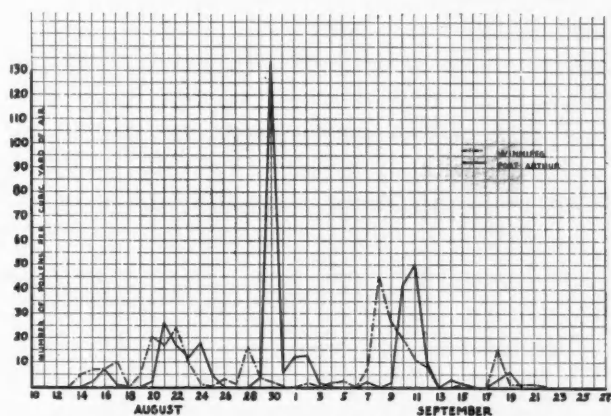


FIG. 5.—The records at these two cities contrast with records at Toronto, Ottawa and Montreal. It will be seen here that on only a few days during the season are concentrations of ragweed high enough to cause hay fever.

*folia*) are found. This member of the ragweed family may be of local importance. There are also a few granules of sage (*Artemisia*) pollen. Wind direction seems to be an all-important weather factor here. Very little pollen appears on the slides except on days of southeast winds. Whether or not this indicates natural barriers on all other sides, I do not know. Presumably most of the agricultural lands in this vicinity lie to the southeast of Winnipeg. A local field study should be made.

If the expression "publicist" can be applied to Osler, it is only in the sense that his reputation and abilities constantly brought him into public relations. He was no platform orator, "making a noise like a reformer," but a kind of Prospero, who saw fit on occasion to rebuke evil and folly, and to incite people or groups of people, to do good work, by the stimulus of his enthusiasm and the magic wand of his encourage-

TABLE I  
RAGWEED INCIDENCE IN CANADA AND BORDER STATES  
1929-1932

City	1929	1930	1931	1932	Averages
Prince Albert....	6	....	....	....	6
Port Arthur....	....	....	226	378	302
Winnipeg .....	130	252	278	330	330
Montreal .....	439	740	806	662	662
Ottawa .....	....	459	623	541	541
Toronto .....	581	1,357	1,600	1,179	1,179
Sault Ste. Marie	500	....	....	500	500
Moorhead .....	6,267	3,501	3,946	3,995	4,427
Detroit .....	2,193	3,901	5,547	3,880	3,880
Buffalo .....	4,202	3,948	14,675	12,386	8,803

#### REFERENCES

1. DETWEILER AND HURST, *J. Allergy*, 1930, 1: 334.
2. DURHAM, *J. Allergy*, 1931, 2: 258.
3. *Ibid.*, 1932, 3: 357.
4. *Ibid.*, 1933, 4: 105.

ment. Whether it was campaigning against malarial fever and tuberculosis, zeal for the better education of medical students and nurses, keeping his students and friends busy with suggested lines of research or the mere casual human touch with some isolated physician or patient in a distant city, there was always this abiding note of contagious enthusiasm and generous encouragement. (From Sir William Osler Memorial Volume, 1926, p. 31).

## RAT-BITE FEVER IN CANADA

BY R. CAMERON STEWART, B.Sc., M.D.,

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LONG known, almost world-wide in its distribution, striking in its clinical picture, rat-bite fever, or sodoku, is still a comparative rarity. The periodicity of the temperature curve places it among the relapsing fevers. Although definitely non-venereal, sodoku shows some interesting analogies with syphilis. The initial lesion exhibits a characteristic reaction which may go on to the formation of a chancre-like ulcer; the lymphatic system early becomes involved; a rash is usually a prominent feature; and improvement follows the use of the arsphenamines. The apparent relationship existing between the various diseases is of course not fortuitous, but is based on a similar etiology. The *Spirochæta recurrentis* of the relapsing fevers and the *Spir. pallida* of syphilis are more or less allied to the organism commonly associated with rat-bite fever, which is called by some observers *Spirochæta morsus muris*, by others *Spirillum minus*.

Transmitted only by the bites of rats, or of other animals, such as cats, weasels or ferrets, which come into contact with rats, sodoku is met with in individual cases, but never occurs in epidemics. Its peculiar scattered incidence is a natural result of the habits and distribution of the infective rats. These migratory animals, cunning enough to evade rat-guards and other deterrent devices, and frequently taken on board unnoticed with the cargo, are stowaways on every ship that sails the sea and are at home in every port. They apparently often harbour spirochætes with little inconvenience to themselves, which readily spread to other rats in the course of the obscure feuds and wanderings which feature rodent society. The present almost universal incidence of the disease is thus easily explained, wherever the original focus may have been; human infection is merely an accident. Sodoku seems to be more common in Japan and India, but whether this is due to a higher rate of infectivity among the local rats, or to a greater liability to rat-bite because of

the housing accommodation and habits of the people, is still an open question.

The importance of a knowledge of the disease lies in the fact that a case may be encountered anywhere in city or country, at any time. Prompt recognition and adequate care will usually effect a rapid and permanent cure, but an untreated case may run a long and tedious course, with much suffering and disability. While there is a natural tendency to recovery and most of the victims would ultimately get well even without specific treatment, the mortality is by no means negligible, probably approximating 5 to 10 per cent.

## HISTORICAL

The history of sodoku links to western medicine the age-old healing art of the east. When a description of the disease was given by Katsura in a System of Surgery about 1892, it was already recognized in Japan, and reports bearing on it continued to appear. Meanwhile, in America, reactions of an unusual type following the bites of rats and other animals were being occasionally noted, beginning with the observations of Wilcox<sup>39</sup> and Watson<sup>38</sup> in 1840. The European reports began with that of Millot-Carpentier<sup>20</sup> in 1884. The situation was clarified in 1899 by the publication of a paper by Miyake,<sup>21</sup> in which Rattenbisskrankheit or sodoku was clearly described and definitely established as a clinical entity in world-medicine. Since that time the literature has become voluminous and widely scattered. Ruge<sup>49</sup> in 1929, as noted by Bayne-Jones,<sup>42</sup> was able to collect a total of 329 case reports, and Robertson<sup>1</sup> lists over 350 references in his paper of 1930. Comprehensive articles in English on rat-bite fever have been published by Arkin,<sup>2</sup> Blake,<sup>3</sup> Crohn,<sup>5</sup> Knowles and Das Gupta,<sup>15</sup> Lanford,<sup>17</sup> McDermott,<sup>19</sup> Proescher,<sup>27</sup> Robertson,<sup>1</sup> Shattuck and Theiler,<sup>32</sup> Tileston,<sup>36</sup> and others. A study of the disease in the United States, based on 75 cases, has been recently completed by Bayne-

Jones.<sup>42</sup> From the wealth of material available, a summary of the history, etiology, symptoms, course, and treatment is merely a matter of selection. Much of the fundamental work has been done by Japanese investigators. The introduction of salvarsan treatment in a series of cases by Hata<sup>10</sup> in 1912 marked a definite advance. Surveyor,<sup>35</sup> in India, employed the same treatment in a case in 1913, without knowledge of Hata's previous use.

#### ETIOLOGY

The similarity of rat-bite fever to relapsing fever suggested a spirochætal infection,<sup>6, 7</sup> and this was confirmed by Futaki and his collaborators,<sup>8</sup> and by Ishawara and his collaborators<sup>13</sup> in 1915. Several observers have classed the organism as a spirillum rather than a spirochæte, notably Zuelzer,<sup>40</sup> Parmanand,<sup>25</sup> and Robertson.<sup>29</sup> The latter identifies it with the spirillum found by Carter<sup>4</sup> in 1887 in an Indian rat, and therefore calls it *S. minus* Carter, 1887. This is a small and very active spiral or wavy organism, having a somewhat rigid body, with one or more flagella at each end, tending to move rapidly in a straight line. It occurs in the peripheral blood of the patient, and in the serum expressed from inflamed glands, from skin lesions, and from the inflamed tissue in the neighbourhood of the bite. Examination of this wound serum, obtained during an acute exacerbation, under dark-field illumination or in stained smears, offers the best chance of demonstrating the organism in the human subject, but is frequently unsuccessful. The strains vary in virulence for animals. Some are very fatal for guinea pigs, while rats and mice often remain apparently well, at least for a time, although organisms can be recovered from their blood. Great care must be used in interpreting such findings, as it is well known that these animals frequently show a naturally acquired spirochætosis without obvious illness, and the organisms present are morphologically similar to and perhaps identical with those causing rat-bite fever in man. Ido and his associates<sup>12</sup> demonstrated the existence of antibodies in convalescent serum in 1917, and Nakamura has more recently described a complement-fixation test<sup>23</sup> and a method of serum diagnosis.<sup>24</sup>

Schottmüller,<sup>31</sup> Blake,<sup>3</sup> Tileston,<sup>36</sup> Litterer,<sup>18</sup> and Tunnicliff and Mayer,<sup>37</sup> have shown the presence of a streptothrix in the cases they

examined, and Anderson and Spector<sup>41</sup> report the finding of a sporothrix. These observations seem to indicate that infection of another character, rather than true spirochætal sodoku, may occasionally follow rat-bites.

#### CLINICAL FEATURES

The signs and symptoms of rat-bite fever are usually so clear-cut that a diagnosis can be made with reasonable certainty and confirmed by therapeutic test in the absence of positive bacteriological findings. Of 51 cases reported in the United States from 1915 to last year, spiral organisms were positively identified in human or animal tissue in only 8 or 9; streptothrix in 4, and sporothrix in 1. This tends to show that the finding of spirochætes or other organisms, however simple theoretically, is practically very difficult under ordinary conditions, and that the necessity of absolute demonstration should not be overstressed.

The chief features of sodoku may be briefly summarized. It is usual to get a history of a bite or scratch, although in a few apparently typical cases, this cannot be elicited. The initial lesion almost always seems to heal without undue delay. After a symptomless interval, varying from a few days to a month or more, but averaging about two weeks, really the period of incubation, a series of unexpected phenomena develops. The hitherto quiescent wound becomes tender, swollen, and inflamed, and a transient lymphangitis quickly spreads to the neighbouring glands, where the overlying skin assumes a reddened look. The temperature rises suddenly, often with a chill, and with the fever the patient suffers from malaise, headache, muscular and neuralgic pains, sweating, and other signs suggestive of a toxæmia. As the œdematous inflammatory process at the site of the bite resembles a pyogenic focus an incision is frequently made in search of non-existent pus. Within a few days the temperature falls, the other symptoms subside, and the general condition so markedly improves that the patient may be regarded as cured. After a period of remission lasting from four to six days, however, the temperature again sharply rises and the signs and symptoms previously present show an exacerbation. Within 48 hours or so a crisis occurs as before. Meanwhile an erythematous rash, bluish-red in colour, the spots of varying size, with edges well defined and slightly



elevated, may be noted on the body and extremities. The fever tends to recur at regular intervals, the skin lesions, including that about the bite and over the proximal glands, brightening and fading with its rise and fall. Left untreated, these periodic reactions may continue for weeks or months, with a tendency to become less marked as time goes on, and finally eventuate in recovery. A secondary anæmia may develop in the course of the disease. Albuminuria and other evidence of kidney irritation are often present. This may be toxic in origin, although Kaneko and Okuda,<sup>14</sup> in one of the few post-mortems on record, found spirochætes in the kidneys. The lesion at the site of the bite may ulcerate. Kuipers and Ruys,<sup>16</sup> as reported by Robertson,<sup>1</sup> found a leucocytosis with a relative lymphopenia and an eosinophilia during the attacks, an increase in eosinophiles a few days before the attacks, and an eosinophilia during convalescence. The Wassermann test on the blood has been positive in some cases in which a previous syphilis was unlikely, but Bayne-Jones and others consider a negative test to be the rule.

#### DIFFERENTIAL DIAGNOSIS

When fever follows a rat-bite, a definite differential diagnosis may not be possible until sufficient time has elapsed for the development of certain characteristic symptoms and signs. Most wounds heal cleanly under simple dressings with little if any trouble, but several possibilities should be borne in mind. An early onset and the appearance of pus suggests a pyogenic process, to be treated by hot baths, wet dressings, incision, and other standard surgical measures. A longer incubation period and the peculiar bluish-red colour of the inflammatory reaction about the wound, followed by a marked periodicity in the temperature curve, and the appearance of a rash, indicates rat-bite fever. A clinical differentiation between sodoku and streptothrix infection may be impossible, as the symptoms are apparently similar. Atypical fulminating, and afebrile forms occur, but are happily very rare. Abortive cases, running a brief and easy course, may be overlooked. Secondary pyogenic infection may mask and distort an ordinary sodoku.

#### TREATMENT

All bites should be promptly cauterized, treated with wet dressings, and kept under

observation for a month. The arsphenamines give such uniformly good results in rat-bite fever that their use should not be unduly delayed. A single dose will often effect a dramatic cure. Other cases prove more resistant and a series of injections may be necessary. If albuminuria is present, the usual precautions in regard to dosage, diet, etc., should be observed.

#### GENERAL PARESIS, MALARIA AND SODOKU

Preliminary reports covering about 100 cases of general paresis treated in the United States by artificial inoculation with sodoku have been published, by Solomon and his associates<sup>33</sup> in 1926, by Hershfield and his associates<sup>11</sup> in 1929, and by Teitelbaum<sup>50</sup> in 1930. So far as known, this method has not been used in Canada. If the improvement sometimes noted in such cases after inoculation with malaria or sodoku is due to the high temperature alone, it seems probable that the newer methods of controllable diathermy makes the use of induced infections, with their inherent risks and difficulties, now unnecessary for this purpose. The recent development of the air-conditioned radiotherm by Whitney is noteworthy in this connection. An interesting comparative study of therapeutic results obtained from malaria, sodoku, and diathermy was published in 1931 by Neymann and Koenig.<sup>47</sup>

#### INCIDENCE

The natural incidence of rat-bite fever in North America is not high, even allowing for the probability of a considerable number of cases escaping notice. Bayne-Jones<sup>42</sup> issued in 1931 an exhaustive review of all cases known to have been reported in the United States from 1840 to 1930, a total of 81. Of this number, 6 are considered as being probably not true rat-bite fever, leaving 75 accepted cases. To these must be added at least 6 later ones, reported by Orr,<sup>48</sup> Francis,<sup>43</sup> Anderson and Spector,<sup>41</sup> Jenkinson and Jordan,<sup>44</sup> and Mock and Morrow,<sup>45</sup> and Caldwell and Tempelton.<sup>51</sup> In Mexico, Monroe and Mooser<sup>22</sup> identified the organism in one case, and noted the occurrence of two other probable ones. None have been officially recorded in Newfoundland. Canada has had at least 7 cases, of which 6 have occurred in Montreal, but whether these constitute the total number for this country is not definitely known. By recent correspondence it was found that none were on record either at the Dominion Department of Health or the

Bureau of Statistics at Ottawa, or at the departments of the different provinces. Anyone having cognizance of the occurrence of the disease is urged to report it, in order that at least an estimate may be available of its incidence in Canada.

Three of the seven Canadian cases have been already reported in detail in this *Journal*. The fourth presents features of special importance, and is discussed in a separate paper by Dr. H. P. Melanson (p. 656 of this issue). The remaining ones of the series are reported for the first time. Cases 2, 4, 5, 6, and 7 are from the records of the Royal Victoria Hospital, Montreal.

## CASE 1

(Reported by Dr. H. L. Reddy,<sup>28</sup> of the Women's Hospital, Montreal, in *Canad. M. Ass. J.*, 1924, 14: 741). A young woman of 24, bitten on the lower lip in November, 1923, presented typical signs and symptoms, and recovered after treatment with novarsenobenzol. The Wassermann test on the blood was negative. "Suspicious looking organisms resembling spirochaetes" were demonstrated in India ink smears.

## CASE 2

(Reported by the writer<sup>34</sup> in *Canad. M. Ass. J.*, 1928, 19: 575, from the records of the Royal Victoria Hospital). A male infant of six months in September, 1927, had the left cheek bitten and the left eyelid scratched, presumably by a rat. A typical attack followed an incubation period of about 13 days. Recovery occurred after sulpharsphenamine was given intramuscularly. The Wassermann test on the blood was negative. Organisms were not found.

## CASE 3

(Reported by Dr. J. S. Murray,<sup>46</sup> of River John, N.S., in *Canad. M. Ass. J.*, 1930, 22: 236). A youth of 17 was bitten on the left index finger in July, 1929. Typical reactions followed. Recovery occurred under novarsenobenzol therapy. Spirochaetes were not demonstrated.

## CASE 4

(Reported by Dr. H. P. Melanson in a separate paper in this *Journal*. See p. 656). A girl of 3 years, in November, 1929, had lesions on the wrist and upper lip, followed by typical reactions; recovery after treatment with arsphenamine. The Wassermann test on the blood was negative. Spirochaetes were found on two occasions in the blood of the patient.

The following additional cases are reported, from the records of the Royal Victoria Hospital, Montreal.

## CASE 5

A girl of 4 years, in October, 1930, was bitten by a rat on the left little finger and next day received a second bite on the left forearm which was followed by profuse bleeding. Five days after the bite on the finger, and four after that on the arm, an area on the latter became red, swollen, tender, and hot to the touch. In the course of the following week there were noted headache, sore eyes, anorexia, muscular pains, cough, fever, and a small swelling in the left axilla. On the 13th day after the initial bite the arm was red and tender and there was also some tenderness over the left chest. Next day the temperature was 105.8°; reddish

spots were noted on the chest, and some pain and swelling in the left leg. On the 15th day the little finger showed a slightly reddened healing wound; the left forearm on its extensor surface a reddish tender area with somewhat irregular raised edges of deeper colour, with a tendency to fade on pressure; there was no evidence of suppuration in either finger or arm. There were small erythematous areas about the size of a dime, fading on pressure, above and below the left elbow and on the wrist, and two somewhat similar ones above the left knee. White blood cells were 11,100. For about a week the temperature remained approximately normal, but on the 22nd day reached 101.6°, and on the 23rd 104.4°, when the patient was ill and toxic. The purplish red swelling on the left arm was larger and tender, the healing wound on the little finger remained apparently quiescent. White blood cells 10,800. On the next day the temperature was 104° and again 104° on the day following. The left forearm showed marked swelling and a patch of erythema about four inches in diameter, dull red in colour with spots of bluish purple. The skin was hot and tense with a little desquamation, but no tenderness or fluctuation. Outside this area were some pinhead discrete macules. There was another area of swelling and erythema above the medial condyle of the left humerus. The left axillary glands were somewhat enlarged but not tender. No general rash was seen. For the next two days the temperature was normal. On the second, an area of erythematous-maculo-papular rash was noted on each buttock, and 160 mgrm. of sulpharsphenamine were given intramuscularly. Next day, the 28th after the first bite, the temperature rose suddenly to 104.4°, with an acute exacerbation of symptoms and the area in the arm became markedly swollen, painful, and tender, the eruption on the buttocks intensified, a transient scarlatiniform rash appeared on the abdomen and discolorations on the chin and right side of the neck. Two days later the temperature was normal again and the patient's general condition much improved, the arm being still slightly swollen but the colouring less intense. Improvement was maintained for about 16 days, but on the 46th after the bite there developed headache, restlessness, pain in the left arm and side of the neck, with a temperature of 102.2°. On the forearm, and hand, and at the site of the second bite, now indurated, were purplish-red spots, fading on pressure and showing some desquamation. There was a reddish purple indurated swelling, somewhat tender, on the extensor surface of the left arm, and a similar smaller swelling between the left shoulder joint and the neck. The left side of the face was swollen, and the posterior cervical glands enlarged. Some petechiae were visible on other parts of the body. Next day the temperature was 102° and the white blood cells 9,800. The temperature showed a downward tendency to subnormal three days later, when 160 mgrm. of sulpharsphenamine were given intramuscularly. Temperature rose to 101.2°, with a slight chill, but quickly subsided. Three days later a similar dose was repeated without obvious reaction. After this for some time the patient felt well and gained weight, but in a little over two weeks an inflammatory reaction again appeared in the left arm, followed by fever and white blood cells of 9,600. The condition rapidly improved and the swelling gradually subsided. After another similar interval of about 18 days a red line was noted from the middle of the left forearm to the axilla followed by an erythematous-macular eruption over the body, slight redness, swelling and tenderness in the left arm, malaise, headache, pain in the left ankle and behind the left ear. These signs and symptoms quickly cleared. Temperature 100.4°; white blood cells 7,000. A week later 0.18 gm. of sulfarsenobenzol were given intravenously.

The urine showed albumin, acetone bodies, and occasional casts and pus cells early in the disease, but later became normal. The Wassermann test on the blood was negative, as was the test with old tuberculin, 1/10



mgrm. intradermally. No spirochaetes were demonstrated.

This case is reported in perhaps tedious detail because of certain unusual features. As there is no reason to think that there was any defect in the drugs employed, the apparently slow response to therapy may have to be attributed to some personal idiosyncrasy in the patient. Persistent recurrences in spite of seemingly adequate treatment have occasionally been reported, and analogous resistance is of course known in connection with other diseases. McDermott has suggested that when this occurs in cases of rat-bite, the possibility of a streptothrix or leptothrix infection should be borne in mind. Such a possibility has not been excluded here.

The successive exacerbations showed a general tendency to become less severe, with lower temperatures and leucocyte counts. They extended over a period of more than three months, with intervals when the patient was apparently well. The desirability of at least occasional observation of cases considered to be convalescent is an obvious deduction.

#### CASE 6

A baby girl, about six weeks old, in the early summer of 1931 was bitten by a rat on the back of the head. A few weeks later the head became swollen and there was some fever. A month after this illness the baby was admitted to hospital with diarrhea and vomiting, loss of weight and cough, signs suggestive of a gastrointestinal upset and possible respiratory tract infection. The lymph glands were found to be generally enlarged, the liver and spleen were palpable, and there was evidence of a mild dehydration. The temperature after admission was irregular but later showed a tendency to rise at five or six day intervals, the maxima being 103° on September 23rd and 30th, and October 7th, and 102.6° on October 14th. On this day a questionable blotchiness of the skin was noticed. Six days later the temperature reached 102.8°. Rat-bite fever was suspected and it was decided to try a therapeutic test. Accordingly on October 25th, the day before the next rise was expected, 0.040 gm. of sulpharsphenamine was given intramuscularly. During the three

following days the chart showed spike rises to 103.6°, 102.4°, and 103.4°, with normal temperature intervals between. Thereafter it remained normal and the general condition of the baby improved.

The Wassermann test on the blood and the intradermal old tuberculin test were negative. Spirochaetes were not demonstrated, but on the clinical findings a diagnosis of rat-bite fever was considered justified.

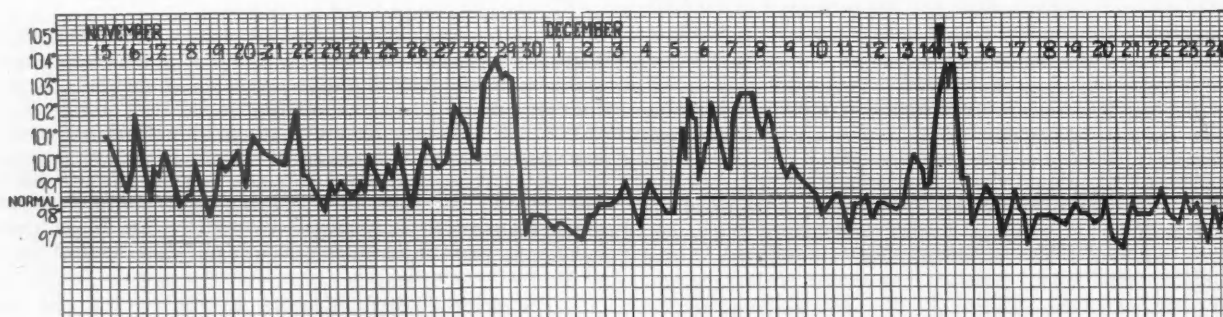
#### CASE 7

A boy of 11 years in November, 1931, was bitten by a rat on the right hand. Two weeks later, on admission to hospital, he was suffering from general malaise; pain, redness and swelling at the site of the bite; a red streak on the right forearm and swelling of the right epitrochlear and axillary glands. The course of temperature after admission is shown on the Chart. The inflammation about the bite subsided, but an erythematous rash was noticed, consisting of a few flattened spots, fading on pressure, on the face, body and legs, and a wide streak on the right forearm. The patient did not seem to be seriously ill. He was given an intramuscular injection of 0.28 gm. of sulpharsphenamine; the temperature continued to rise for some hours, reaching 104°, after remaining up for a time it dropped sharply, and showed no tendency to recur. The rash faded rapidly and the patient was soon discharged apparently well.

The Wassermann test on the blood was negative. Spirochaetes were found in a gland of an inoculated guinea pig, but were not demonstrated in the blood of the patient, either by dark field illumination or in stained smears.

[Another case in the records of the hospital, suggestive of a possible rat-bite fever, may be briefly noted, but is not included in the present series as a conclusive diagnosis was not made. A young man of 20 years was admitted in April, 1924, with a history of headache, sweating, and recurrent chills for about 3½ months. A roseolar eruption had been noticed for some weeks, more marked during the chill. In hospital, chills occurred at intervals of about 3 or 4 days. No plasmodia of malaria were demonstrated and there seemed to be no improvement with quinine, but after the administration of 0.3 gm. of novarsenobenzol intravenously only one small rise of temperature recurred. The prompt reaction suggested a spirochætal infec-

CHART



COURSE OF TEMPERATURE IN CASE 7.  
(Administration of sulpharsphenamine indicated by arrow).



tion of some kind. There was no history of rat-bite and no local area of inflammation].

#### COMMENTS

That at least 6 cases are known to have occurred in Montreal within ten years indicates that a considerable proportion of the rats must be infective.

Five of the 6 cases occurred in the autumn months of September, October, and November. The significance, if any, of this seasonal incidence in Montreal is not understood, but two possible explanations may be suggested. This city is a great seaport, with ships arriving from all parts of the world during the season of navigation, which extends from April to the end of November. If infection is imported by alien rats and transmitted to the local rodents, the latter would naturally show heaviest infestation towards the end of the shipping season, and the winter might have some obscure influence in lessening the disease among them. Another possibility is that the local rats are more or less infective all the time, but that they reach maximum numbers after a prosperous summer with abundance of food, and consequently that then the risk of rat-bite is greater than at other seasons. Murray's<sup>46</sup> case occurred in July, 1929, in a country district in Nova Scotia. Reference to this question of seasonal incidence has not been noticed in the literature.

It is noteworthy that in all six of the Montreal cases the Wassermann test on the blood was found negative.

The suggestion is made that the failure to demonstrate the organisms in some of the cases, clinically definite, may perhaps have been due to search being made in the blood, rather than in the serum expressed from inflamed tissue. It is now known that the latter is a more likely place to find them.

#### SUMMARY

Scattered cases of rat-bite fever have occasionally been reported from different parts of the world, including about 85 from North America. At least 7 are known to have occurred in Canada within the past ten years. These are recapitulated in a series of case reports, preceded by a brief history and general description of the disease.

Physicians having cognizance of other cases in Canada are asked to make them known.

*Acknowledgment.* The examination and treatment of five of the cases described were carried out by various members of the Staff of the Royal Victoria Hospital, Montreal. This collaboration, with free access to the records, and the aid and criticism of Dr. Jonathan C. Meakins, Physician in Chief, of Dr. H. B. Cushing, Head of the Sub-department of Pædiatrics, and of Dr. Graham Ross, also of Dr. Edward Francis, of Washington, D.C., are gratefully acknowledged.

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THE BLACK RAT BRINGS THE DANGER OF PLAGUE TO BRITAIN.—London medical scientists fear that a plague epidemic may break out there sooner or later if present conditions continue. The calamity, if it comes, will be the result of interfering with nature's biological balance. This feeling is crystallized by Dr. W. Langdon Brown, Regius Professor of Physic at Cambridge University. The plague-carrying flea lives on rats, but black or dark rats are a worse plague menace than brown ones. In Britain black rats are gradually increasing. If they are allowed to continue to multiply a plague epidemic in London is likely to follow. In

big cities such epidemics tend to break out as soon as carriers of the germ become sufficiently numerous. London's freedom from plague epidemics since the "Great Plague" of 1664-5 has been due to the dominance of the brown rat, which came to England on ships, bred very rapidly and almost exterminated its natural enemy, the black rat. During recent years, however, there have been so many campaigns against rats in general that millions of the brown rats have been destroyed. The race of black rats has thus been able to make headway.—*Science News Letter*, December 31, 1932, p. 417.

## A CLINICAL CLASSIFICATION OF BRIGHT'S DISEASE\*

BY HEBER C. JAMIESON, M.B.,

Edmonton

BRIGHT, in his "Reports of Medical Cases," published in 1827, was the first to note that in many cases of dropsy there were well marked lesions in the kidney, and that there was a heat-coagulable substance in the urine. He described three forms of this condition, but left it an open question whether or not they were separate diseases. Virchow first pointed out that in one form the tubular epithelium was mainly affected and in the other the interstitial tissue. He suggested the names parenchymatous nephritis for the former and interstitial nephritis for the latter. These terms have been included in the classification of Bright's disease in England and America until recently.

In 1902 Strauss, and one year later, Widal, called attention to increased urea in the blood of nephritics. Widal also noted that the ingestion of salt increased oedema in Bright's disease. He introduced the terms "azotæmic" and "chloræmic" as suitable terms for the nephritis without oedema and that with oedema. Christian used the names "chronic nephritis with oedema" and "chronic nephritis without oedema" in his classification. Volhard and Fahr brought out their well-known nomenclature for diseases of the kidney in 1913. Since that time much confusion has resulted because of the difficulty of correlating the clinical findings with the pathological. In consequence, a dozen new classifications have appeared and old ones have been modified in the hope that order might come out of chaos. Unfortunately the expected order did not follow. Since Bright's day the finding of albumin in the urine has been looked on with suspicion. If casts are also detected a diagnosis of nephritis often follows. As albumin and casts can be found in the urine of normal persons under many conditions, and severe Bright's disease may exist without the presence of albuminuria, they are not essential to the diagnosis of this affection.

According to Volhard there are three chief signs of Bright's disease: hæmaturia, oedema and hypertension. Since hæmaturia is commonly found without nephritis, oedema is frequently present in cardiac decompensation, and hypertension exists without renal inadequacy, more difficulties have arisen in diagnosis. Recently Volhard has suggested a classification which appears to be reasonably satisfactory to both clinician and pathologist. A modification of this will be found useful by the general practitioner in the diagnosis and management of this disease.

Three distinct and separate forms of Bright's disease can be distinguished, each characterized by *one* of these signs. A fourth form in which *two* or *all three* are blended in varying degrees also exists. A simple classification is possible.

1. Acute hæmaturic glomerulo-nephritis;
2. Lipoid nephrosis;
3. Arteriolarsclerotic Bright's disease;
4. Diffuse glomerulo-nephritis

(a) acute; (b) subacute; (c) chronic.

A graphic representation of the scheme is shown in Fig. 1.

## ACUTE HÆMATURIC GLOMERULO-NEPHRITIS

The upper circle represents the pure form of hæmaturic Bright's disease. It is characterized by the presence of blood cells in the urine, but neither oedema nor hypertension. The presence of tube casts containing red blood cells or only acid hæmatin may be the deciding factor in the diagnosis. This affection is caused by the streptococcus in over 90 per cent of cases, and it occurs *at the height of an infection*, usually of the upper respiratory tract. Tonsillitis and sore throat are common sources. A rare form may be seen in subacute bacterial endocarditis. As a rule there is no retention of metabolites in the blood, but an exceptional case may show an increase in these substances. A raised serum-globulin value is usually seen but no change in the serum-albumin. The increased globulin is believed to be due to the infection. Occasionally scalding of the urine, or, if the hæmaturia is marked, difficulty in voiding may be experi-

\* From the Department of Medicine, University of Alberta.

A paper read before the Alberta Medical Association, September, 1932.

enced. The blood usually disappears with the passing of the acute stage of the primary disease.

Pathologically, thrombosis of the afferent arteries and capillary loops of the glomerulus is seen. Bacteria have been demonstrated in this region of the kidney. The lesion is almost wholly confined to the Malpighian corpuscles. Kidney function may be normal or lowered considerably in a severe case. Complete recovery is the rule. This form constitutes a distinct group, frequently undiagnosed because of the absence of œdema. The following is an example of a mild form of this disease.

#### CASE 1

S.B., aged 9. On the third day of acute follicular tonsillitis, with a temperature of 103°, the child complained of scalding on urination. Examination showed a smoky urine. Blood cells and blood casts were found. There was no œdema, and the systolic blood pressure did not exceed 80 during the disease. Macroscopic blood disappeared from the urine in 6 days. A month later there was neither albumin nor red blood cells in the urine.

#### LIPOID NEPHROSIS

Where the presence of œdema alone determines the type, the term lipid nephrosis is commonly applied. The circle on the left represents this form. The kidney shows degenerative lesions. This disease in its pure form is rare. Many cases treated as lipid nephrosis are really later stages of a diffuse nephritis in which evanescent hypertension has disappeared and only the œdema remains. The disease in this form has been called by the Germans chronic nephritis with a nephrotic "Einschlag" or "tendency." Lipoid nephrosis was first described by Friedrich Mueller in 1905.

œdema does not set in until the serum-proteins fall to 4.5 per cent, so a patient may be ill for weeks before the œdema is in evidence. Weakness may be the only symptom complained of. The urine will show large amounts of albumin, few red cells, but many white blood cells and doubly refractile bodies. The degree of proteinuria may be extreme. The blood shows diminished plasma proteins and greatly elevated cholesterol values. Sufferers from lipid nephrosis are susceptible to infection from pneumococci and streptococci. This variety of Bright's disease is more common in children and young adults. Renal function is normal and the prognosis is usually good. Half the cases that succumb do so of streptococcal or pneumococcal peritonitis. Pure lipid nephrosis is a separate entity, as much so as acute hæmaturic

nephritis. The pathology of the kidney is different from that in the hæmaturic type. The tubules, particularly the proximal convoluted, show marked degeneration. Little change is detected in the vascular system, but slight alterations have been demonstrated in the glomeruli.

A case is here presented which is representative of pure lipid nephrosis.

#### CASE 2

W.N., a male, aged 66, entered hospital with œdema and ascites. Blood pressure 100/70. Red blood cells 4,800,000; white blood cells 8,500; hæmoglobin 90. Twenty-four hour urine, 400 c.c.; specific gravity 1030, acid, albumin + + +, sugar negative, many granular casts. Blood chemistry: cholesterol 720, non-protein nitrogen 28 (old method); serum albumin 2.22; serum globulin 1.82; total 4.04. The patient was placed on a high protein, low fat diet. In 12 days he lost 35 pounds in weight and œdema was not demonstrable. Phenolsulphonethalein 60 per cent in 2 hours. The specific gravity of the urine ranged between 1022 and 1038. Protein loss in urine, 5.6, 6.13, 5.1 grm. On discharge, one month after admission, cholesterol 322, non-protein nitrogen 31.2, urea nitrogen 16.8, creatinine 1.3. Basal metabolism, plus 3. Urine: albumin +; granular casts, few. The Wasserman test was negative. Nine months later, the blood pressure was 120/84; blood protein 7.2; the urine showed no albumin, no casts. Four and one half years later, urine: 1022, no albumin, no casts. Blood pressure 120/84. Concentration to 1027, dilution to 1002. Non-protein nitrogen 25. Red blood cells 5,620,000, hæmoglobin 96. Serum albumin 3.75; serum globulin 2.2, total 5.98.

#### ARTERIOALSCLEROTIC BRIGHT'S DISEASE

The right hand circle in Fig. 1 shows the group in which hypertension is the only sign. Any condition in which the blood pressure is continuously raised is potentially a form of Bright's disease. Similar pathological changes, differing only in degree, can be found in the finer blood vessels. In essential hypertension there is no renal insufficiency, but let the renal arteriolar changes increase and the kidney function diminish, retention of nitrogenous waste products in the blood follows, and arteriolar-sclerotic Bright's disease has developed.

The earlier in life hypertension is found, the more rapidly does Bright's disease manifest itself. Those cases appearing in the thirties or early forties usually progress quickly into a state of renal insufficiency. These have been sometimes termed malignant hypertension. When the blood pressure does not increase until after 50, the renal vessel changes take place more slowly as a rule and the patient may die of some intercurrent affection, often of vascular origin, before kidney involvement is marked. Apoplexy or cardiac failure may close the scene.

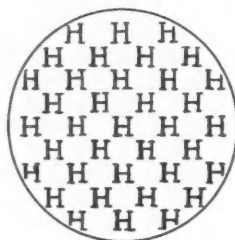
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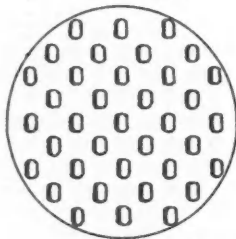
## CASE 3

A male, aged 44. A year and one-half before admission he had almost daily headache on waking. This gradually disappeared after breakfast. Sometimes there was headache at the base of the skull. The blood pressure was 180/100. One year before admission headaches became more persistent and he noticed some blurring of vision. He consulted an optometrist and was given glasses but got no relief. Several visits in the next six months failed to improve his vision or relieve the

## HÆMATURIA



## OEDEMA.



## HYPERTENSION.

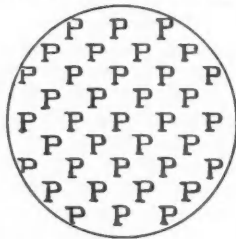


FIG. 1.—Modified from Volhard.

headaches. Two months before admission the headaches and eyesight became worse. Old and new retinal hæmorrhages were noted with some oedema of the disc. Blood pressure 200/115. Non-protein nitrogen 57. Indican +. The urine showed albumin ++ with granular and hyaline casts, a few red blood cells and pus cells.

On admission dyspnoea, insomnia, and restlessness were noted. Blood pressure 240/120. Non-protein nitrogen 175; creatinine 5.6; indican ++. The urine contained albumin +++, and a few casts or blood cells. The fundi showed oedema and hæmorrhages. Cheyne-Stokes breathing developed. The patient died of uræmia.

## DIFFUSE GLOMERULO-NEPHRITIS

Reference to the overlying circle in Fig. 2 will explain the position of diffuse nephritis in the scheme. It consists of a combination of the three cardinal signs of Bright's disease; hæmaturia, oedema and hypertension. The more acute the affection, as a rule, the more blood in the urine and the less pronounced the hypertension and the oedema. Cases of longer duration show less hæmaturia and either the oedema or the hypertension may predominate. If the former, a condition of nephrosis may supervene; if the latter, vascular signs will fill the picture and renal inadequacy follow.

One may conveniently divide this diffuse form into three stages: acute, subacute and chronic. The acute diffuse glomerulo-nephritis

lasts less than two months. The subacute extends to six months, while a longer duration than this determines a chronic affection. The signs of the acute diffuse type as we have already seen, are a mixture of hæmaturia, oedema and hypertension. It is usually secondary to an upper respiratory infection, but comes, not at the height of the infection as does the hæma-

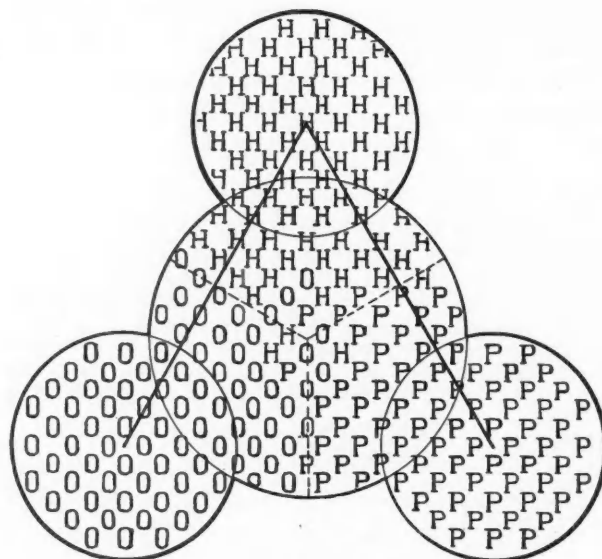


FIG. 2.—Modified from Volhard.

turic form, but when the primary condition is subsiding, generally from two to four weeks later. The oedema in the acute stage is believed to be due to increased capillary permeability, since the plasma proteins are not diminished. The streptococcus is the common offending organism. It is frequently found on culture of the urine. Youth again bears the brunt of the attack from this disease.

Dyspnoea and headache are probably the main presenting symptoms. Sometimes pain in the chest is marked. This type was common among soldiers in France during the war and was called "trench nephritis." The prognosis is usually good. Should recovery not follow within two months a subacute stage has been reached. To determine if complete recovery has occurred may require some of the more delicate tests of renal function. For this, the Addis cast count is particularly valuable.

## CASE 4

G.E., aged 21, female, complained of severe ear-ache. In three days the ear discharged. The temperature was normal four days later. Fourteen days after this the discharge almost stopped, and she went to work. On that day marked swelling of whole body developed. The urine was smoky and contained albumin +++, blood and granular casts. The blood pressure at the height of the attack was 180/120. In two months

the blood pressure was 125/82. The urine showed no albumin, no casts, few red cells. Concentration to 1028; dilution to 1001. The urea clearance was 79; phenolsulphonaphthalein 60 per cent; non-protein nitrogen 23.

The course of unhealed diffuse glomerulonephritis may vary. One may find a patient becoming more and more oedematous and a condition of nephrotic "Einschlag" be diagnosed. On the other hand there may be absence of oedema but increasing hypertension may be manifest. Diffuse glomerulonephritis is the most common form of Bright's disease encountered in practice and no two cases run an exactly similar course. Pathologically, glomeruli, tubules and arterioles are affected. One might say that there is a diffusion of signs and a diffusion of pathological lesions. An example of chronic diffuse glomerulonephritis follows.

#### CASE 5

D.B., aged 17, female. Six months before admission swelling of the ankles, then of the whole body, coming on three weeks after tonsillitis was noticed. She was in bed sixteen days on a limited milk ration. No oedema was present on discharge. The oedema returned in a few days and was present off and on until five weeks before admission, when her tonsils were removed. Oedema was marked after operation, but was gone in two weeks on a limited diet of milk.

On admission, general oedema and pallor were present. The Wassermann test was negative. Urine: specific gravity 1017-1925, no albumin, no sugar, no casts, no red blood cells in the first two specimens. Blood pressure 178/116. Blood chemistry: non-protein nitrogen 125; creatinine 4.5; cholesterol 165; serum albumin 4.34; serum globulin 2.3, total 7.64. Blood: red blood cells 2,400,000, hæmoglobin 47. The patient

died two weeks after admission. The day before death, blood chemistry: non-protein nitrogen 179; creatinine 12; calcium 8.5. The blood pressure was 161/110. Anuria was present for several days before death.

#### SUMMARY

There are three monosymptomatic forms of Bright's disease, each with a distinct part of the renal structure involved. In the hæmaturic, blood appears in the urine, coming from glomerular inflammation. In the dropsical, the urine shows excessive proteinuria and the kidney exhibits tubular degeneration. The hypertensive variety may early show only this sign, but, later, increasing degrees of renal insufficiency develop. The arterioles of the kidney are then found to be affected, while the tubules remain normal and only slight glomerular alterations can be detected. In the diffuse nephritis all three signs are seen, and glomeruli, tubules and arterioles suffer damage, but no two cases will show these three parts of the excretory organ involved to an equal extent. This accounts for the varied findings in this type of Bright's disease. The more chronic the diffuse form, the more advanced are the pathological changes.

It is also important to remember that unhealed hæmaturic nephritis may become diffuse and follow a course either to a nephrotic or a hypertensive ending, or may cause death before a definite swing to either of such states has time to occur.

MAGIC IN MEDICINE.—The Contributors' Column of the *Atlantic Monthly* for January refers to an instructive monograph by Prof. S. L. M. Rosenberg of the University of California, entitled "Sixteenth Century German Medicine." In this monograph Professor Rosenberg quotes some of the favourite prescriptions of Dr. Oswaldt Gäbelthouer, Court Physician to the Duke of Württemberg and Theck. The following are some of the favourite prescriptions used by this court physician in the sixteenth century:

"If blinded by a cataract, take a goodly quantity of crickets, crush in a clean mortar, and squeeze the juice through a cloth. Apply to the eye three times a day, one drop only, morning, noon, and night, until sight is restored."

For epilepsy: "Take the right eye of a wolf, the left of a she-wolf; dry, and hang about the neck of the patient, who must wear them for three months continuously, during which time he must neither bathe nor otherwise get his body wet."

"For weak heart, or palpitation of the heart, or any heart trouble, nothing is better than good wine, quantities of it, frequently resorted to. A few coins of fine gold placed in the wine vessel will add to the wine's effectiveness."

"If a worm attacks your heart, cut up a large radish, mix with salt, and eat on an empty stomach. Your heart worm fears nothing so much as a radish."

For goitre: "Take a horse's hoof, bake till charred in a new pot; grind to powder; mix with oil. Use this salve frequently."

For cramp: "Hang the tail of an otter about the patient's neck. That will drive the cramp away. Or you may hang the teeth of a March hare about the sufferer's neck next to the skin. This has proved very helpful."

For cancer: "Heat the juice of peach-tree leaves, small burrs, and nettles; moisten a cloth with the mixture, and apply . . . Or take the tongue of a wolf, dry thoroughly, powder; make into a salve with flour and honey. Before applying, wash the sore places well with wine."

For fever: "Secure the hearts of three pickerel, keep about an hour in sharp vinegar, and eat raw. . . For a three-day fever, try your best to have the patient swallow a fresh pickerel heart at one gulp; if impossible, get it into him as best you can."

For wounds: "If produced with iron or any weapon whatever, secure the weapon if you can and bury it deep in the soil until a cure is effected, then you may pull it out again."—*The Diplomat*, 1933, 5: 142.

## INJURIES OF THE SEMILUNAR CARTILAGE: EFFECTIVE TREATMENT OF RECENT INJURIES AND OF SOME RECURRENT TYPES\*

By C. STEWART WRIGHT, M.B.,

*Toronto*

FROM long observation of knee-joint injuries one is struck with (1) the lack of uniformity of treatment at the time of the initial accident, and (2) the frequency of recurrences. I refer particularly to injuries to the lateral capsular ligaments, and to those of the semilunar cartilage, which are so often closely involved with lateral ligament damage, most frequently of the internal lateral ligament and its closely attached semilunar cartilage. The usual story is that an accident has occurred to the joint by a twist of the foot outward and the knee inward, with abduction of the tibia, resulting in immediate pain on the inner side of the knee joint, with or without locking of the joint, but always with some limitation of complete extension and with swelling and variable disability.

The treatment as I have said is quite variable. If locking is present this is usually corrected and most commonly a bandage is applied, and the only restraint effected is the inhibition produced by the pain, which gradually diminishes and the patient progressively uses the knee more. Under such or similar treatment with perhaps more but incomplete restraint, recurrences are common.

As to the diagnosis. A history of recent injury, with locking of the joint or inability to completely extend the joint, and tenderness along the attachment of the internal lateral ligament at its tibial insertion, affords strong evidence of cartilage involvement as well as ligament injury. If the tenderness is most acute at the femoral attachment the cartilage is not so likely to suffer. When even the acute phase has passed a persistently tender spot on the tibial margin, about a half to one inch from the patellar ligament, is very suggestive of cartilage involvement. Loose bodies and synovial fringes, which may be pinched, are to be considered here, but the matter can usually be decided from the history or ruled out by x-ray.

In any case, if one has satisfied himself of

the existence of an injury to a lateral ligament or to ligament and cartilage the indications for treatment are definite and should be carried out in a manner calculated to meet the pathological condition present if subsequent recurrences are to be minimized or prevented. In recurring cases, also, no definite procedure apart from operation has been offered to relieve these patients. In view of the fact that there are certain patients who cannot for various reasons submit to an operation, or who will not, I wish to present a technique of treatment which has been carried out in 33 patients over a period of eight years. The theory of the treatment is based on the same principles as apply to fractured or ruptured tissues elsewhere, *viz.*, reduction and fixation for a sufficient time to permit repair to take place, but with this addition, *viz.*, to recognize the deficient nature of the circulation to cartilaginous structures and hence the necessity of artificial stimulation to assist repair. I therefore combine with the reduction and fixation the injection of an irritant tincture of iodine, five to ten minims, at the point of injury. The object of this is to produce enough aseptic inflammatory reaction to cause the torn cartilage to unite. The other feature in connection with the treatment to be considered is the function of the joint. Fixation for a few weeks, with entire disuse, is very prone to produce troublesome stiffness of the joint, but reduction and fixation, with the encouragement of weight-bearing, reduces this tendency to stiffness almost to zero. There is another fact which is self-evident. In a fully extended knee there is no place for cartilage except in its proper relationship, since, being wedge-shaped, weight-bearing on an extended knee forces it into position and keeps it there. An exception to this is the almost complete bucket-handle type, in which case the cartilage goes to the centre of the joint, and, therefore, except in this type, extension weight-bearing gives every opportunity for healing and in as nearly exact anatomical reposition as is possible.

\* Read before the Section of Surgery of the Academy of Medicine, Toronto, on November 15, 1932.



The next factor to consider is the muscle relationship to the integrity of the joint and the effect of injury on it. There is always an affection and weakening of the muscles about an injured joint, and there is no joint in which this is more noticeable than the knee; a very marked muscle atrophy occurs about the joint and particularly of the vastus internus of the extensor group. Disuse enhances this atrophy, and therefore disuse should be avoided. When the period of partial disuse has passed and the joint is given freedom, the condition of the muscle, the proper tone of which contributes so much to the stability of the joint, requires special attention. This is best effected by faradic stimulation and massage. It is important that the faradic stimulation should not be too strong or too prolonged. It should be just sufficient at first to get contraction, and not more than eight or ten contractions at one sitting, sufficient to awaken a lethargic reflex, and should be followed by gradually increasing active exercise. The other requirement to be met is the prevention of strain on the lateral ligament through the bevelling of the heel by elevation on the inner border by one-quarter to three-eighths of an inch. During the early convalescence a flannelette bandage, cut on the bias, is used, but not tightly applied, which is gradually shortened and finally discarded.

To summarize, then, the treatment of an injured lateral ligament with displaced or injured cartilage or a severe injury of the lateral ligament alone is:—

1. Reduction. This is usually accomplished by nearly full flexion, internal rotation of the tibia, and extension, preferably under an anæsthetic. The only definite indication of complete reduction is a knee that can be completely extended without force, or even affords the sensation of slight hyperextension. Sometimes various movements must be tried to get reduction; even the reverse of the usual may be effective.

2. Injection of five to ten minims of tincture of iodine at the point of greatest tenderness, and deep enough to reach the tibial border, to create an aseptic inflammatory reaction sufficient to aid the cartilage to adhere.

3. Fixation in extended position by a light plaster with only stockinette or single bandage lining, and a piece of silence cloth over the knee and the prominence of the head of the fibula. This is kept on two weeks.

4. After one, or at most two days' rest, permit function by walking, *i.e.*, weight-bearing. This function in the extended position maintains the cartilage in a position to unite, but at the same time prevents the development of stiffness, which is the usual result of fixation with complete rest. Very commonly these knees flex from one-half to a full right angle, with none or only slight discomfort immediately the plaster is removed. This partial function also prevents the degree of quadriceps wasting otherwise obtained.

5. Muscle redevelopment. This might be considered a refinement of the treatment, as if the first four principles are carried out recovery will usually be effected. It is, however, most important to re-establish muscle tone as early as possible, and I consider this part of the treatment a most important guarantee against an accident or recurrence through a lack of muscle response in any sudden or unexpected stress on the joint. There is no part of the treatment more important as a guarantee against recurrence. The best effect is obtained by faradic stimulation, massage, and active exercises.

6. Prevention of mechanical stress by elevation of the heel of the shoe on the inner border for internal cartilages. Usually one-quarter to three-eighths of an inch wedge is sufficient. An exception to this procedure. In very acute primary injuries swelling may be so tense and pain so severe as to make the early fixation in plaster inadvisable, in which case extension should be preserved by a posterior splint and rest, and if the swelling is very great and the pain acute aspiration is advisable and will give great relief. Fixation and weight-bearing, as described, is then adopted as soon as possible. In the recurrent cases the condition is seldom so acute as to prevent at once the routine treatment.

In the past eight years 33 patients have had treatment in this manner. Five cases only were primary injuries, 4 with a history of locking. None are known to have recurrence, though 2 were lost track of after six months. Two cases are satisfactory after two years and one for one year. Of 28 recurrent cases, one, a case that gave trouble almost regularly every few weeks on the least provocation, for a period of two years, was followed for three years after treatment without any recurrence and, so far as I know, has stayed well. This was one of the

first cases injected, and was treated in this manner only because for various reasons consent to an operation could not be obtained. This is the type in which I advise operative treatment, but when consent cannot be obtained, or has to be delayed, I treat it conservatively. The patient who has had one or two recurrences is the type in which the conservative treatment may justly be advised. Of the balance of the patients treated one had a recurrence that persuaded to operation. This was a case of complete bucket-handle fracture, and one could easily appreciate that it was unsuitable for conservative treatment, though in my operative cases this is not the usual type but the exception. One has had slight twinges, but never locking or severe inconvenience. Fourteen have had no recurrence to date, and the balance have not been traced after one year, but up to that time were symptom-free. Most of the patients continued their work or attended school or college during the treatment by this method.

*Operative cases.*—In the past twenty years over 200 knee-joints have been operated on, mostly for cartilage injury, and I feel the conditions revealed justify the conservative effort, although for some, as in the complete bucket-handle type, its futility is obvious.

In operating I prefer the use of a tourniquet with the knee at a right angle over the edge of the table, and for the cartilage incision I prefer a slightly curved one extending from about the centre of the patella distally, curved down to and then along the border of the tibia about one inch, in all about two inches. Skin, capsule and synovial sac are each opened separately and at a slightly different level, and are sutured separately, the synovia with plain 0 gut, the capsule with No. 1, chromic, and the skin with silkworm gut. In the earlier cases I used a plaster splint, later a posterior splint, but for some years now I have used a pillow splint, which I have found very satisfactory. I usually release and re-apply the compression bandage, (which has been put on over a liberal supply of raw cotton from

the toes up) in twenty-four hours, and allow a little movement on the third or fourth day, gradually increasing this up to the time the stitches are removed in ten to twelve days, at which time careful use in walking is allowed. Occupation is resumed usually during the fourth or fifth week.

Generally things go smoothly, but on three occasions I have had serious concern. One patient operated in "flu" time, although I had waited a month and thought he was over his attack, had a temperature of 103° on the evening of the same day he was operated on, and he had other evidences of a general infection. This also hit the knee and I thought looked like a disaster. Closed irrigation and aspiration on three successive days saved the knee, and its further recovery was satisfactory and complete. Another patient after forty-eight hours of normal progress developed an extremely painful and swollen joint on the third day. One aspiration relieved the symptoms and there was no further trouble. A third patient developed a painful and tender knee after five days with high fever. I was anxious, but relieved, when I observed a well developed tonsillitis. The knee also subsided with the general condition. A few cases have had a little tendency to swelling on being allowed up, which necessitated a further short period of rest.

These experiences rather teach me that one should be slow to establish outside drainage should things appear to go bad, as this may be due to systemic conditions, and will subside with them or will yield to closed aspiration and irrigation. However, my aim is, particularly, to call your attention to the possible benefits of a conservative effort by injection and fixation, especially as my experience goes contrary to the usually pessimistic attitude regarding the non-operative treatment of displaced semilunar cartilages. I have thought also that a slight record of my experience in the operative cases which gave me temporary concern and anxiety might be worth recording.

ONE ADVANTAGE OF COLOUR-BLINDNESS.—Do not feel too sorry for the colour-blind, for their defect has been found to give them one advantage over persons with normal colour vision. The colour-blind have more than average ability to distinguish between different shades of light and dark. On this account, a colour-defective engraver is said to be especially prized by a Philadelphia publishing house. Colour-blindness, which afflicts between 3 and 4 per cent of males, was found quite handicapping to a group of young medical students

who were examined by Drs. Leandro M. Tocantins and Harold W. Jones at Jefferson Medical College, Philadelphia. Some of the young doctors could not recognize the rash on scarlet fever patients. They all had trouble in distinguishing between differently-coloured bacteria under the microscope. However, their better-than-average ability to distinguish between different shades of light and dark should make them particularly well suited to x-ray work.—*Science News Letter*, April 1, 1933.

## SYCOSIS AND X-RAYS

BY ALBÉRIC MARIN,

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STAPHYLOCOCCIC sycosis is a most persistent affection which shadows the existence of the individual who suffers from it. Very often, its first appearance is in the form of Bockhardt's impetigo, which is, in short, no more than a superficial folliculitis, an infection of the follicular sheath, ostio-folliculitis. It may appear in any part, for example, on the upper lip, following an infection of the nasal cavities. Instead of remaining localized at the ostium, the pyogenic coccus may go down into the sheath of the follicle and infect it in its entirety, producing the symptoms of sycosis. This disease is distinguished by pustular papules, each of which is pierced by a hair; these are of variable size and are surrounded by a congested area. The disease may appear on the nucha, the pubes, the axillæ, the scalp and the face.

The skin of the face is reddened and there is œdema. Follicular papules, small pustules, excoriations and crusts appear. The hairs finally loosen and fall. If an attempt is made to extract them, they come out readily and painlessly, and their roots are found to be surrounded with a purulent sheath, as is not the case when a healthy hair is pulled out, or one which is embedded in a follicle, the tip only of which is infected. The disease may involve every part of the face where there is a heavy growth of hair—the upper lip, the cheeks, the chin, the supra-hyoid region, the eyebrows and the eyelashes. The other areas, where the growth of the hair is merely downy (the forehead, the nose, and adjacent parts of the cheeks), are generally immune. The disease is obstinate, sometimes developing over a period of years, and leading to permanent alopecia. Its development is attended by lulls and sudden spasms when there is tension, burning and pain. Sycosis may be spread to parts that are adjacent to those affected, shaving being a factor in this on account of the daily irritation which it causes to the follicles.

The fact that this infection is so deeply seated explains its obstinacy. External applications, be they never so powerful, do not reach it. Occasional types of sycosis are cured by means of lotions and ointments, but in the vast majority of cases these treatments are ineffective. The same may be said of ultra-violet ray treatments, even the most powerful of these being too superficial in their effect. Extraction of the hairs is a lengthy and painful procedure, requiring numerous sittings and rarely resulting in cure. This treatment is out-of-date, and is too ineffective and painful to be recommended. Ionization is still recommended by many (Meyer, Saidman and Juster), but it must be used in combination with the extraction of the hairs with tweezers, cauterization of the pustules, etc. The treatment is lengthy, and, if the case is severe and the area affected extensive, the proportion of cures is not high. Several antiseptics are used, most frequently, Alibour water in positive ionization.

Recourse must be had to radiotherapy, but not necessarily with epilation as the end in view, as this is not always indicated. Indeed, from a therapeutic standpoint, we must separate pyogenic sycosis into three distinct groups, although the etiology of these groups is identical. Some forms of the disease (and these are the most numerous) clear up very well when given mild weekly radiations. They do not require intensive heavy doses, and do not call for epilation. We admit that x-rays have no antiseptic virtue. Even in heavy doses, they do not sterilize a culture of bacteria, of microspora, or of trichophyta. But in mild doses they produce a defensive reaction in the skin, enabling it to rid itself of various forms of pyogenic dermatitis after a few radiations. X-rays are not microbicidal *in vitro*, but are truly antiseptic *in vivo*, as is demonstrated in the treatment of numerous cutaneous infections. A second group, which is more refractory, necessitates temporary epilation. In these cases, weak doses are not suffi-



cient to give rise to the necessary cutaneous reaction. The hair, in falling, brings with it a considerable proportion of the focus of infection and excites this defensive reaction. There will be a new growth of normal hair, and the patient will show no further sign of staphylococcic infection. If treatment is delayed, there will be scarring and more or less extensive areas of alopecia. These are, however, sequelæ of the sycosis and are not caused by the x-rays.

Finally, a third group necessitate permanent epilation. As in the case of the second group, there was temporary epilation, and a new growth of hair occurred within a given period. But no sooner was this growth complete, or shortly after, than the lesions of sycosis reappeared. A second temporary epilation was succeeded by a second relapse. For patients of this group, permanent epilation is necessary; otherwise, the disease recurs continually.

#### TECHNIQUE AND DOSAGE

Where the disease is localized (the axillæ, the chin and the upper lip), the affected part only is treated, adjacent areas being shielded. It is desirable, however, to extend the surface to be exposed one or two centimetres beyond the limits of the parts that are clinically affected. Certain difficulties arise in connection with treatment of the face. There, the skin is more sensitive to the rays than it is elsewhere, particularly where the subcutaneous layer is thin; on the cheek-bones, the margin of the lower jaw, etc. Besides, epilation of the beard sometimes requires a heavier dose than is needed for the scalp. Thus, a dose that will give complete epilation in a child with ring-worm, will, in the case of an adult with sycosis, produce alopecia only, followed by erythema. Radiation of a few isolated spots in the region of the beard presents few difficulties, but where the entire face is concerned, a certain delicacy of touch is required. But epilation is not necessary in all cases, and when it is indicated, it need not all be done at one time, as in the case of the scalp, but in fractional doses, as will be shown later.

For treatment of the face, the patient lies on his back, the head turned toward the shoulder. The tube is centred on the angle of the jaw. The cheek, the submaxillary region, the chin, the region under the chin and the upper lip are irradiated. The scalp and ear are shielded. The same operation is repeated on the opposite

side. The overlapping of the oblique rays on the chin, under the chin, and on the upper lip allows for sufficient totalization to produce satisfactory results. However, in the case of chubby patients, as these points are too remote from the foot of the direct ray, it would be desirable to give several additional radiations toward the end of the treatment if folliculitis still persists. The tube should be centred successively on the upper lip and the tip of the chin if the sub-hyoid region is affected. These two applications are practically at right angles one to the other. The mucous surface of the lips, the nose, and the upper part of the face (with the exception of the bearded region), the supra-hyoid region and the chest are to be shielded.

Whether the sycosis affects the bearded region or elsewhere, our first aim should be to obtain a cure without epilation by means of small weekly doses—one-quarter of the erythema dose per sector, ordinarily 8 to 12; sometimes, however, 16 are required. After four or five treatments, the intensity of the pyodermitis abates. The interval between subsequent sittings is then increased (fortnightly intervals), or the dosage lessened (one-eighth erythema dose). The intensity of the radiation on the chin and under the chin is also lessened (one-fifth and one-eighth erythema dose). We invariably use unfiltered radiation, although some are in favour of filtration. The latter is more particularly indicated when infiltration is present.

In the case of numerous radiations, it is necessary before each one to study the skin carefully for any signs of irritation which would indicate saturation. This irritation shows itself by a temporary intense redness following light friction or tapping of the skin, exposure to the sun or wind, or some emotional excitement. This condition must always be regarded as a danger signal, and the x-rays should be discontinued for several weeks, then resumed with caution in weaker intensity when the danger has been averted. To continue treatments after this symptom has appeared is to invite the occurrence of erythema. After several sittings, pigmentation occurs in some individuals. This early pigmentation does not call for discontinuance of the treatments; it is merely temporary and it disappears in a few weeks. More or less dryness of the skin may be present. This condition indicates a necessity for prudence,

observation of the degree of irritation, and diminution of intensity.

*Temporary epilation.*—In refractory cases, where cure has not been effected after sixteen fractional radiations, temporary epilation, after a six-weeks' interval of rest, should be considered. This is done according to the Kienböck-Adamson method, which, briefly, is as follows. The rays are allowed to overlap; no protection is required for immediately adjacent parts. The principle is the same as total radiation of the scalp for tinea. Parts which are not affected are to be shielded—the chest, the nose, the forehead, the ears, the scalp and the mucous surface of the lips. The face is divided into four areas, and the tube is centred successively on (1) the angle of the right mandible; (2) the angle of the left mandible; (3) the centre of the upper lip; (4) the centre of the chin. Exposures 3 and 4 should be almost at right angles one to the other.

As previously stated, the latitude between the epilating dose and the erythema dose on the face is less than it is on the scalp, and the epilating dose, if given at the outset, often brings about erythema with distressing sequelæ. It is recommended, then, that this margin be extended so as to obviate this annoyance.

One method is to epilate, not at one single sitting but in four, with an interval of three days between each, the dose each time to be one-quarter of the erythema dose. After a week, in the absence of symptoms of irritability, the one-quarter erythema dose may be repeated once or twice (at an 8-days' interval) if the falling of the hair has not been hastened. But the hair usually does fall in a few days after the first four applications, patients with brown skins and those with a coarse growth of hair constituting a few exceptions.

Another method is by means of lightly filtered radiation. Indeed, with filtration, there is greater latitude between the epilating dose and the erythema dose. These treatments are to be given every three days, one-quarter of an erythema dose four times, as in the first method. However, unfiltered radiation for lesions where no filtration is present does not produce erythema as frequently as we are led to believe it does. Nevertheless, filtration is desirable in the case of deep-seated lesions. With us, we have until now irradiated without filtration, and so far have met with no difficulties.

Finally, the recent method of Buschke and Langer ensures greater if not absolute security. This consists in combining the action of acetate of thallium and x-rays, a half-dose of each, bringing about added therapeutic results and reducing the danger of accidents by one-half. Acetate of thallium is given in the proportion of 4 milligrams per kilo. of the patient's weight, and half an epilating dose (one-half an erythema dose) is given at the same time. The hair falls out at the end of eighteen days or thereabouts. Nevertheless, even in this quantity, acetate of thallium may cause pain in the lower limbs and anorexia for several days. Filtered radiation at one-half the epilating dose, combined with half a dose of acetate of thallium would appear to be the approved method (Andrews).

*Permanent epilation.*—In refractory cases, where there has been relapse after temporary epilation, it is necessary to perform permanent epilation. There is always danger with this of giving rise to telangiectasia later on. But on the whole, this condition is less distressing from an æsthetic standpoint, and causes less annoyance to the patient than does a case of recurring sycosis. Besides, the occurrence of telangiectasia is the exception if there has been no previous erythema, and we have outlined the precautions which can be taken so that, in most cases, it may be avoided.

The first treatment consists in epilating according to one of the methods previously described. Next, to prevent the re-growth of hair in six weeks, it is sufficient, after the hair has fallen, to administer every three weeks one-half of the erythema dose during four or five months. If the case is carefully watched, erythema rarely occurs during these last radiations. It occurs more frequently in the early part of the treatment. After permanent epilation has been done, there is dryness of the skin to a greater or less degree; this is sometimes quite marked. There may also be atrophy, which often manifests itself only by a slight wrinkling near the mouth and on the chin, particularly in patients whose skin is of fine texture and whose complexion is clear. However, the x-rays must not be blamed for all the damage that is done. The disease itself may cause marked alopecia, atrophy and scarring. It is to be noted that strong local applications are not to be used before, during, and after the x-ray treatment, as to do so is to invite the occurrence of erythema. At the most,

only an emollient or mildly antiseptic lotion should be used. Some have recommended the use of ultra-violet rays before the x-ray treatments. We are of the opinion that this practice should be prohibited for the same reason as stated in connection with strong local applications.

Some authors have remarked upon the appearance of a modified form of sycosis after permanent epilation has been effected. This is explained by the fact that while the coarse hair has fallen, it has nevertheless been replaced, here and there, by a downy growth which may, in turn, become infected. It seems reasonable to believe that had these patients received a few additional treatments this condition would not have occurred.

Taking into account those patients only whom we have been able to observe over a twelve-month period, we have, during the past few years, treated 17 cases of sycosis of the bearded region. In the first place we attempted to treat the disease by small weekly doses. When epilation was necessary, we used the Kienböck-Adamson method in fractional doses. In all cases, unfiltered radiation was employed. Cure was

effected in all 17 cases: 13 by means of small weekly doses; 4 by means of temporary epilation. In no case were we obliged to have recourse to permanent epilation. The four cases of temporary epilation all showed temporary dryness of the skin, but erythema occurred in one only. We have had this case under observation for twenty months, and there is, as yet, no indication of telangiectasia; probably this condition will not occur. None of the 13 patients who were cured without epilation suffered from erythema, but in nearly every case there was pigmentation, which gradually disappeared when treatment was discontinued. In the case of one, we noted a slight cutaneous wrinkling around the mouth. It is likely that these two conditions (erythema, which fortunately had no sequelæ, and slight atrophy) would not have occurred had we made use of the method of Buschke and Langer.

The treatment of sycosis by x-ray is far from being responsible for all the damage which is attributed to it. It cures more rapidly and at less cost than other forms of treatment. In most cases, it is the only method of treatment that is effective.

### MENTAL CONFLICT\*

By W. H. CASSELS, M.D.,

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IN regard to mental patients the one question which the public seem to ask more commonly than any other is, "What is the cause?" Unfortunately this is one of the most difficult questions to answer. We may know that heredity has a bearing on a certain case; the patient's personality may predispose to a given type of disorder; a physical or mental strain may play a part; but to say that these conditions constitute all the etiological factors is impossible. All we can say is that they contribute to the patient's breakdown.

Mental conflict is a condition which may be regarded as an important contributing factor in the etiology of many mental disorders. I cannot attempt to present the psychoanalytic view,

which regards conflicts in early life as causing repression of complexes which result later in mental breakdowns. I am interested in the conflicts which occur later in life, which are more or less evident to the patient and perhaps even to his physician or friends, and which may be amenable to treatment if recognized in time. By conflict we mean, of course, a struggle between two or more opposing forces. Such a struggle may occur in one's mental life. One excellent example of the pernicious effect of mental conflict occurs in Shakespeare's *Macbeth*. Here was a man who was not naturally a villain, but, rather, was gifted with very fine feelings. You remember near the beginning of the play he was "Valiant Macbeth," "Duncan's peerless kinsman." It was only his overmastering ambition, goaded by his dominating wife, that drove him, against his better nature, to murder

\* A paper read at a meeting of the doctors of the Provincial Mental Hospital, Ponoka, and the surrounding district, on October 20, 1932.



Duncan. Here was a conflict between his moral standards and his desires; but after he had committed the deed and murdered Duncan it was far worse. It was then a conflict between his moral standards and his past misdeeds, for which there was no redress; his self-respect was forever destroyed. Thus he developed strange behaviour and vivid hallucinations which typified the conflict going on in his mind. How closely that story resembles some of the histories we get in mental hospitals.

## CASE 1

(Reg. No. 5857, P.M.H., Ponoka). The first patient I am going to show you is a somewhat shy and sensitive woman of 29. She has been married for six years, and although married life has not been altogether happy she says she still loves her husband. Some time before her marriage she yielded to temptation and had two sexual irregularities with other men. Ever since then her conscience has regarded these acts as a sin and has tortured her. She has now become depressed and feels that she has no right to live. She has appeared depressed, disinterested, and preoccupied. She shows a retardation at times amounting to inhibition. Her chief worry is about her sexual irregularities. She has heard God's voice condemning her for doing wrong and telling her to repent. Diagnosis—Schizophrenia (catatonic type).

In trying to analyze the various conditions which cause conflict it would appear that they fall roughly into three classes: (1) the actual condition; (2) the desired condition; (3) the approved condition.

*The actual condition.*—Those conflicts which fall in the first group are quite varied in their nature. Many people fret about their lot in life: a millionaire because he is afflicted with poor health, or a poor man because he is in the bread line; one woman because she is married to a husband who treats her brutally, or another woman because she has been bereaved of a husband who was good to her. You will notice that these actual conditions may relate to the patient's circumstances in life, or to some person with whom he is concerned, or to some condition within himself. In the case of the patient we just saw, for instance, the difficulty lies in a condition which she considers sin, which she has brought upon herself, and which she cannot now alter. I may illustrate this type of conflict with another case.

## CASE 2

(Reg. No. 5774, P.M.H., Ponoka). This is a German woman of 30 years, well built, and of good personality, although a little below normal intelligence. In the Old Country she was a chamber-maid in rather well-to-do homes, so that although she was of the poorer class she was accustomed to comfortable circumstances.

At the age of 21 she came to Canada to marry a man she had not seen for ten years.

Since coming here her life has been literally intolerable. Her husband is a mean, self-centred, sarcastic brute, who has failed to provide her with the ordinary necessities of life, although he had sufficient money. His mother has dominated the situation and has helped to antagonize the husband against the patient. They live in a shack little better than a hovel, with only one thickness of boards. There is practically no furniture. The patient has been bullied and harassed, and expected to cook adequate meals, besides cutting brush and stooking grain and having a baby almost every year for eight years. In this situation the patient naturally became exasperated. Her people have said she was crazy for the past two years. It is doubtful if she has shown any marked mental symptoms over that period. For a short time, three years ago, and again for a day or two before admission, she was excited and possibly hallucinated. She appears to us to be a little too complacent and disinterested, but otherwise we have seen no mental symptoms. Her abnormality throughout the past few years would seem to be that she was too tolerant, as it would be difficult for any normal person to endure the life she lived. She now says that she wants to go home for the sake of the children, though she has no love for her husband. In our opinion it is doubtful if she can possibly make a permanent adjustment at home owing to the unsatisfactory conditions, but she would probably get on very well working in a good home as a domestic. Undiagnosed psychosis—a reactive state.

*The desired condition.*—You may notice that in some cases the patient frets about his actual condition, while we would consider the condition a normal and satisfactory one. In other words, the conflict arises because the patient's desires are abnormal and incompatible with actual conditions. There are other cases again in which the desires may clash, not with actual conditions, but with approved conditions.

The nature of one's desires may vary. For instance we may have ambition, which may be for money, physique, social position, intelligence, education, love, desire for sexual gratification in less approved forms.

One thing which is apt to direct one's desires into abnormal and unattainable channels is fantasy or day-dreaming. An individual who develops the habit of gratifying unwholesome desires in imagination soon loses satisfaction in the more ordinary pleasures that reality affords. The conflict between a desire and reality is well illustrated in the following case.

## CASE 3

(Reg. No. 5455, P.M.H., Ponoka). This woman is probably well over 35, although she says she is 25. She was always a little slow to make friends and was quite reserved. She married at 18, but was later divorced because her husband was unfaithful. Four years ago she worked for another man, and fell in love with his brother. As it was an unsuitable match, and he showed no interest in her, the desire could not be gratified. She scarcely admitted her feeling to herself, but attributed her passion to a mental power this man had

over her. Ever since that time she has heard his voice in a most persistent way. She claims that it is disagreeable to her, but it is fairly obvious that she acquires a good deal of satisfaction from it to compensate for her frustrated love. Since coming to the hospital a year ago she has worked well in one of the kitchens. She has maintained a good appearance and talks well. She says the voice is least troublesome when she is working. She is pleasant and friendly, but we consider the prognosis poor. Diagnosis—Schizophrenia (paranoid type).

*The approved condition.*—The question of approval or disapproval of certain conditions is very interesting. In the case of the first patient we saw, the conflict was between the actual condition created by her misconduct and the fact that she did not approve of that conduct. Had the irregularities occurred without her disapproval there would have been no conflict. In other cases the conflict arises between a desire and a disapproval of that desire. The disapproval may be so strong that the person never actually yields to the desire, but the conflict is present, nevertheless.

Disapproval very often comes in the form of conscience. Really, conscience is based on our moral standards and ideals which, in turn, are the result of training. Therefore, there are individual differences in the rigidity of these standards. Some people are so conscientious that they will worry if they accept a few cents too much change at the railway depot, while others will be only too pleased if they can steal a ride on the train. The person whose standards are abnormally strict is naturally most subject to conflict, because it is more difficult for him to conform to these standards. We may also notice individual differences in the severity with which people condemn themselves for errors. Some people take the attitude that there is no use crying over spilt milk, whereas others never forget that they have slipped from the straight and narrow path.

Conflict due to disapproval naturally arises most frequently with regard to sexual temptations. Sex is a subject with an unusually strong emotional accompaniment which adds force to its desires; on the other hand, it is surrounded by the most rigid moral restrictions which clash with natural desires.

The following case illustrates a conflict in which both the patient's actual condition and his strongest desires have clashed with his moral ideals.

#### CASE 4

(Reg. No. 5817, P.M.H., Ponoka). This is an unmarried man of 37 who has a shy, reserved and introspective disposition. He has been an habitual masturbator, with infrequent heterosexual experiences. He was first admitted to hospital in 1926 with ideas of persecution, thinking detectives were after him. He had self-accusatory ideas centring around his relations with loose women. Although discharged twice he has never been completely recovered. He has been afflicted with ideas of guilt and auditory hallucinations which accuse him of sin. He is constantly depressed, worried and apprehensive, has lost interest, and has deteriorated somewhat. He broods over his masturbation, for which he thinks he is doomed, and he states that he has acquired a most loathsome disease (the Wassermann test was negative). Here is a sample of his conversation,—“No, I can't get well—I can't get remission from sin—I never had any sense—I am a criminal—I never had any intention of killing anyone—I should have been whipped.” Diagnosis—Schizophrenia (paranoid type).

Much could be said regarding the outcome of conflicts, and the processes by which they bring about various results. I cannot, however, do more than offer a few suggestions as to the procedures which may be followed in trying to avert the development of serious mental disorders.

1. The most satisfactory result is a resolution of the conflict, a harmonizing of the opposing factors. If our first patient could be persuaded that her irregularities were forgivable, or if the home conditions of the second patient could be improved, their conflicts would cease to trouble them. Such a resolution is of course more easily accomplished in the early stages of the conflict before the patient's attitudes on the subject are fixed.

2. Sublimation is the next most desirable outcome. By this process an unsatisfied desire is redirected into wholesome channels. For instance a bereaved mother may give vent to her feelings by assisting with works of charity.

3. The two opposing forces may each be accepted but not allowed to come into contact in the mind. This is what Bernard Hart refers to as “logic tight compartments.” It is a solution which will only occur when neither factor is particularly strong. For instance a person may accept quite literally the Biblical story of the Creation and at the same time accept as proved that we have developed by evolution from lower animals.

In concluding this paper the point which I wish to stress is that many serious conflicts would be amenable to some simple form of adjustment if recognized and treated before a definite disorder has developed. Very often a little sympathy and understanding may add new

interest to a person's life, or may open his eyes to a new view of his difficulties. Or it may be that an adjustment of his conditions may make things easier for him. We have in the hospital a patient who has now a hopeless disorder of a paranoid nature. Going back through her history one finds that ever since her marriage her husband has failed to understand her, and in particular has failed to provide medical attention for a pelvic disorder she developed. Years of fretting passed before she was finally operated on, only to break down mentally while convalesc-

ing physically. Whatever else may have contributed to her psychosis, there is no doubt that increasing domestic dissatisfaction was one important factor, and some good advice to her husband twenty-five years ago might have averted her present trouble.

Many such cases must come under the observation of physicians, and although such patients will not all develop serious mental trouble, there is no reason why their lives could not be made happier and better by an effort at adjusting their conflicts.

### THE PRESENT STATUS OF ANÆSTHETIC ETHER REGARDING ITS COMMON IMPURITIES\*

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ETHER peroxide and acetaldehyde are the two common noxious substances which by their presence in anæsthetic ethers have been held to be responsible for some of the most marked and extraordinary untoward reactions, as well as for others which, although not so dramatic in their onset, nevertheless complicate the operative and anæsthetic recovery. These further oxidation products of ether indicate, of course, decomposition, and while it is questionable whether they have, in themselves, been responsible for any or all of the unfortunate experiences occurring during ether anæsthesia with which they have been credited, it is now generally agreed that decomposed ether is to be avoided in anæsthesia.

The chemical investigation of ether was stimulated by the enormous number of convulsive seizures occurring during ether anæsthesia, and not infrequently ending in death, reported by English anæsthetists about 1926 and 1927. Dr. Hadfield's<sup>1</sup> description of a typical case of ether convulsions will demonstrate most clearly that they are real, and different from convulsions of other etiology. It will also impress upon us the great effort of the English investigators in analyzing the ethers used in cases in which convulsions of this type complicated their administration. He describes these as follows: "The patient usually develops slight twitchings around the eyes or mouth, or both. These develop into

convulsive epileptiform seizures involving the whole body and sometimes violent enough to shake the operating-room table. The action of the cardiac and respiratory centres does not seem to be affected primarily, but soon becomes so from the violence of the movements and may cease. If the anæsthetic is discontinued, the movements may diminish and recovery follow. Unfortunately, this is not always so and death on the table has resulted. Alternatively, the convulsions may continue after the patient has been returned to bed, with a fatal result. Sometimes they may return several hours later and then cause death."

S. R. Wilson<sup>2</sup> reported a number of cases which occurred when ethers which contained aldehyde and peroxide were used and he concluded that they were the cause. Most of the cases occurred in the northern part of England, and an investigation disclosed the fact that many institutions in this locality were using relatively impure ethers marked "not for anæsthetic purposes." There are known cases when ethers which were free from both impurities, before use, were used. However, it has been shown that two different brands of ether, each of which shows neither impurity when freshly opened, after having a stream of oxygen passed through it may then vary greatly in their stability. In an analysis of two leading English brands of ether in 1927, Boyle<sup>3</sup> demonstrated that both were, so far as the most delicate tests could determine, equally pure when freshly

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opened, but when subjected to various conditions they reacted quite differently. The one remained pure in spite of the various treatments, while the other developed quantities of aldehyde and peroxide. The conditions to which he subjected the two brands of ether were, first, passing a stream of nitrous oxide and oxygen through for one-half hour, then repeating the procedure with the glass container surrounded by a hot water jacket, and finally allowing a strong light to shine on the ether container. In the ether which developed aldehyde and peroxide larger quantities were noted when the water jacket was used, while the strong light had no effect. It seems, therefore, that passing the oxygen through initiates the process of decomposition, and heat accelerates the reaction. Clinically, the effect of heat seems to be borne out by the fact that practically all the cases which have thus far been reported, occurred during the warm weather, or the patients had been anaesthetized by the ether bomb. While Wilson was certain that aldehydes and peroxides were the etiological factors, because when he ceased the use of ether containing them his cases ceased, it has been pointed out that this also coincided with the onset of the cold weather.

Bourne<sup>4</sup> has studied the effects of some of the supposedly noxious compounds which might be expected to occur in ether, chiefly peroxide and aldehydes, by adding these substances in definite amounts to pure ether and then noting their effects on respiration, blood pressure and recovery in the dog. He concluded that acetaldehyde up to 0.5 per cent does not produce any significant changes. With 1 per cent there is marked respiratory embarrassment and consequent concomitant effects on blood pressure, but the animals recover well. The ether had a marked odour of aldehyde with the latter concentration. Peroxide in a concentration of 0.05 per cent caused a marked lowering of blood pressure and pronounced respiratory disturbance. In a concentration of 0.5 per cent, even after prolonged administration, there was no noticeable effect upon the animal. This would lead us to believe that neither peroxide or aldehyde in the concentrations found in ether when convulsions occurred could have been the entire cause. However, add to this the feature of specific susceptibility to develop convulsions under anaesthesia, toxæmia, or sepsis, and we may have a very important etiological combina-

tion. Mendenhall and Connolly<sup>5</sup> have, quite recently, shown that aldehyde and peroxide in concentrations of 0.02 per cent in ether have distinctly toxic effects on the ciliary activity of the oyster. The cilia of the mammalian respiratory mucous membrane, being much more sensitive, may help to account for some of the more common anaesthetic pulmonary complications.

We have subjected to most delicate chemical tests for peroxide and aldehyde over one hundred samples of ether from several of the well known American and Canadian manufacturers. The various conditions to which the ethers were subjected and the results obtained are here tabulated and are self-explanatory.

The tests used for the detection of aldehyde

TABLE

Conditions of Experiments	Results		
	Number of Specimens	Aldehyde	Peroxide
Fresh ether.....	20	None	None
Container opened, exposed to air for 1 hr. then corked and allowed to stand for			
1 day	8	None	None
2 days	4	None	None
3 days	4	None	None
4 days	4	Trace	None
Ether stream of O <sub>2</sub> for 2 hrs. then allowed to stand for			
1 hour	4	None	None
1 day	8	None	None
2 days	4	Trace in 1 specimen	None
3 days	4	Trace	None
4 days	4	Approx. 1:80,000	None
5 days	4	Slightly over 1:80,000	Trace in 1 specimen
Ether stream of O <sub>2</sub> for 2 hrs. strong (100 watt) light.... Then allowed to stand	4	None	None
1 day	8	None	None
2 days	8	None	None
3 days	4	Trace	None
4 days	4	Approx. 1:80,000	Trace
Ether allowed to stand then O <sub>2</sub> passed through for 1 hour in presence of light. Allowed to stand			
1 hour	4	None	None
1 day	4	None	None
2 days	4	None	None
3 days	4	Trace	None
4 days	4	Approx. 1:80,000	None

and peroxide were the following modifications of B. P. methods.

For peroxide.—Add one c.c. of a colourless 10 per cent aqueous solution of potassium iodide to ten c.c. of the ether to be tested in a colourless glass-stoppered bottle which has been previously rinsed with the ether to be examined. Shake. If as little as 0.0005 per cent peroxide is present a yellow colour will appear within five minutes.

For aldehyde.—Add three c.c. of Nessler's solution to twenty c.c. of the ether to be tested in a glass stoppered bottle. Shake. Then allow the layers to separate. There should be no immediate yellow colour or turbidity. On standing in contact with Nessler's solution an aldehyde-free ether which contains alcohol will show a yellowish or whitish turbidity due to the reducing action of alcohol upon the mercuric salts present in Nessler's solution. Therefore the colour should be judged immediately after shaking.

Definite quantities of acetaldehyde were added to pure ethers and the above tests made. Ether containing 1 part of acetaldehyde in 80,000 gave most marked positive reactions. The test for peroxide also proved most delicate. Ethers con-

taining either aldehyde or peroxide never showed the presence of acetic acid.

#### CONCLUSIONS

1. The presence of aldehyde and peroxide in ether is undesirable, and, in view of the uncertainty as to their true significance, it is better to discard any ether which contains either one or both.

2. Ethers supplied by leading manufacturers at the present time are of a high grade and stand up well under most severe conditions.

3. Ethers of the type tested may be used on the second day after standing in a gas machine, with apparent safety. This period should not, however, be exceeded.

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### THE DIAGNOSIS AND TREATMENT OF DISORDERS OF THE PARATHYROID GLANDS\*

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THE parathyroid glands are concerned with the regulation of the level of calcium and phosphorus in the blood,† and with the metabolism of these elements. Parathyroid in-

sufficiency results in a distinct lowering of the serum calcium with an associated rise in the serum inorganic phosphorus,‡ diminished urinary excretion of calcium and phosphorus, and the clinical picture of tetany. In hyperparathyroidism there is, on the other hand, a high serum calcium, a low serum phosphorus, and tremendous excretion of calcium and phosphorus in the urine. Due to the excessive loss of bone salts, the skeleton finally becomes weakened, fractures occur, the spine shortens, and gross deformities develop, giving rise to the picture of generalized osteitis fibrosa cystica. There are, then, two distinct types of parathyroid disease: (1) hypoparathyroidism with clinical tetany, the symptoms being associated with a low serum calcium; (2) hyperparathyroidism with generalized osteitis fibrosa, the most striking changes being due to the weakness of the bony skeleton.

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† In healthy individuals serum calcium levels lie between 9 and 11 mg. per 100 c.c., occasionally rising as high as 12 mg. Similarly, the serum inorganic phosphorus level lies usually between 3 and 4 mg., occasionally as high as 5 mg., and more rarely between 2 and 3 mg. In growing children the serum phosphorus level is higher, being frequently about 5 mg. After ingestion of carbohydrate or administration of insulin the inorganic phosphorus falls. Any finding of serum calcium below 8 mg. or above 12 mg. per 100 c.c. is abnormal and, similarly, phosphorus levels below 2.5 or above 5 mg. are abnormal. Considerable confusion has arisen with regard to the interpretation of blood calcium levels because of the inaccuracy of many reported results. Any method for determination of serum calcium demands the greatest carefulness and accuracy on the part of the technician at all times. Solutions must be repeatedly checked and standardized. In the methods commonly used in which the precipitated calcium oxalate is titrated with dilute permanganate solutions, inaccuracy usually leads to a fallaciously high result.

‡ Throughout this paper the term "serum phosphorus" will be used with reference to serum inorganic phosphorus.

## HYPOPARATHYROIDISM

*Tetany.*—As its name implies, tetany is a condition characterized by a peculiar tendency of muscles to go into a condition of painful prolonged spasm. This is due to an increased excitability of the motor nerves and the extremities are most commonly involved, giving rise to the well known carpopedal spasm. The syndrome of tetany is, however, much more than simple muscle spasm, and any part of the nervous system may be affected.

The underlying condition appears to be a decrease in available calcium ions, usually associated with a serum calcium level below 7 mg. per 100 c.c. A lowering of serum calcium, though present in chronic tetany, is not essential, for the syndrome may occur when the calcium level of the serum is normal but the ionic calcium low, notably in conditions of alkalosis. As a result of a gross decrease of calcium ions in the body fluids there is a general disturbance throughout the nervous system. The excitability of the motor nerves is increased and spasm occurs spontaneously or on slight stimulation. This commonly involves the muscles of the forearm and hands, larynx, and, less frequently, the muscles of the legs and feet. Any muscle may be affected, however, and spasm of the eye muscles especially has also been noted. The sympathetic motor nerves may be involved, resulting in spasm of the cardia, pylorus, or any sphincter, or any smooth muscle. Sensory nerves also are affected. In fact, paræsthesia of the forearm and hand, often of ulnar distribution, is the most constant symptom of tetany and is frequently present more or less continuously between attacks of carpal spasm. Usually the paræsthesia is of the nature of a tingling sensation that may become very distressing. Most commonly affecting the upper extremities, it is also frequently felt in the legs, especially in the distribution of the sciatic nerves. Often in the crises of tetany the patient complains of girdle sensations and of a feeling of a great weight on the chest. In severe crises there may be general numbness and peculiar sensations which the patient finds difficulty in describing.

Nor does the central nervous system escape. There may be cortical irritation with twitching. Drowsiness is common in attacks. General convulsions and coma occur in severe crises, which may end fatally.

Even when there are no major manifestations of tetany, between attacks, when paræsthesia may either be present or absent, when the serum calcium level is between 7 and 8 mg. per 100 c.c., the syndrome still manifests itself in general weakness and tiredness, a neurasthenic state that is possibly the result of disturbance in the vegetative nervous system due to the low calcium level. These symptoms disappear when the serum calcium rises to normal and become much worse when spasms of tetany appear. Partly as a result of chronic ill-health, but probably due also to the decrease in the freely diffusible calcium of body fluids, certain psychic changes are common. The patient becomes nervous, self-centred, introspective, difficult to handle, sometimes hysterical, often emotional and depressed. Gross changes in conduct, slovenliness and carelessness in appearance may be noted. Such changes are exaggerated in more severe states, and become diminished or disappear when the calcium rises to normal and the other symptoms and signs of tetany disappear.

*Parathyroid tetany* may be either post-operative, following upon a subtotal thyroidectomy, or it may occur spontaneously, just as myxœdema occurs spontaneously. Spontaneous parathyroid tetany is a very rare disease. It affects both sexes at all ages. The onset is gradual, the first symptoms being ulnar paræsthesia, weakness, lack of energy and fatigue. Later, attacks of spasm occur, involving forearm and hands or forearm, hands, larynx and feet. There may be attacks with convulsions or coma. When the syndrome is well established, the course is similar to that of post-operative tetany.

*Post-operative tetany* appears usually in from one to four days after a subtotal thyroidectomy. It is an uncommon complication, which occurs almost entirely in females and in a large proportion of cases after an operation for recurrent goitre.<sup>1</sup> Typically, the patient begins to feel an unpleasant tingling in the arms and hands on the second or third day. This tends to become more intense and more widespread on the third or fourth day, when attacks of carpal spasm associated with hoarseness or stridor appear. The first attacks are usually severe, and may become dangerous because of laryngeal spasm or convulsions and coma. Between attacks, which may last from a few moments to an hour or more, the patient suffers from persistent



paræsthesia most marked in the arms, and often from stiffness of the hands or mild carpal spasm, and from hoarseness.

After the initial rather sudden onset with severe tetany, the symptoms moderate, and, gradually, over a period of a few weeks, the patient passes on to the stage of chronic tetany. Sometimes, fortunately, the damage done to the parathyroid is of a temporary nature only and the symptoms disappear, never to return. It is possible that mild transient tetany due to œdema and trauma of the parathyroid glands, manifested only by paræsthesia with or without slight spasm, occurs more commonly than is usually recognized. In the severe cases that go on to chronic tetany, however, it is probable that the greater part of the body's parathyroid tissue has been removed. This may the more easily occur because the parathyroid glands sometimes have an anomalous location; indeed, parathyroid tissue may be within the thyroid gland.

In the state of chronic tetany, paræsthesia is by far the most constant symptom. It is present almost every day for varying lengths of time; it becomes worse when the patient is nervous or tired; it is almost constantly associated with nervousness, lack of energy, weakness and fatigue. Superimposed on this chronic state of ill health are crises of carpal spasm, sometimes accompanied by the more severe symptoms mentioned above. There is a good deal of variation in the severity of the symptoms of chronic tetany, dependent in part on the amount of damage done to the body's parathyroid tissue, and influenced also by the state of nutrition, the presence or absence of infection, the general physical condition and the mental state. Some patients are totally incapacitated by almost continuous mild spasms with severe paræsthesia and hoarseness, becoming much worse during recurrent crises. In others, the symptoms are very mild and muscle spasm is infrequent. In the same patient there is a good deal of spontaneous variation, both in the clinical symptoms and in the level of the serum calcium. In all cases the condition is aggravated by anything that disturbs the general sense of well-being, by acute infections and malnutrition, by unhappiness and excessive fatigue.

In patients suffering from long-standing tetany, cataracts are of frequent occurrence. These appear even in young people and in parathyroidectomized animals. The cataracts are of

an essentially similar character to those occurring in patients free from tetany and require similar treatment.

*Calcium metabolism.*—The calcium metabolism in parathyroid tetany has been carefully studied by the Harvard group associated with Aub.<sup>2</sup> The important characteristics are: a low serum calcium (below 8 mg. and usually between 5 and 7 mg. per 100 c.c.); a high serum phosphorus (commonly 5 mg. per 100 c.c. or higher); and a diminished excretion of calcium and phosphorus in the urine. The severity of the symptoms does not depend exactly on the lowness of the serum calcium nor on the increase in the serum phosphorus. Probably it varies inversely with the number of calcium ions in the body fluids, but at present there is no means of measuring this quantity. When, however, the serum calcium rises above 8 mg. per 100 c.c., the symptoms become mild or disappear, and in severe crises the serum calcium usually is between 4 and 6 mg. per 100 c.c.

*The diagnosis of tetany.*—The recognition of the syndrome, tetany, is easy during the attack. The carpal spasm is characteristic\* and its association with tingling of the arms or arms and legs, with or without hoarseness or stridor, completes the picture. The hysterical patient who knows a little about tetany is usually unaware of the constancy of the paræsthesia and can seldom reproduce proper carpal spasm. If one is in doubt, if the carpal spasm is mild, or if the spasm has passed off, there are some useful clinical tests which help to clinch a strongly suggestive history:— (1) Chvostek's sign—this phenomenon consists of a twitching of the upper lip, or even of the whole side of the face, that occurs when one taps on the facial nerve just in front of and below the ear. Although it is usually present in patients suffering from tetany, it is not an absolutely constant sign and occasionally may be demonstrated in healthy people; (2) Trousseau's sign is more dependable, although not always present in remissions of the disease. This consists of typical carpal spasm brought on by pressure over the nerves of the arm or by almost complete obstruction of blood flow in the brachial artery. It is most easily demonstrated by maintaining the pressure

\* Flexion of the metacarpophalangeal joints, with extension of the fingers, the thumb and little finger being drawn into the palm; some flexion of the wrists and elbows and slight pronation.

in a blood pressure cuff on the arm at or above the systolic pressure for about three minutes. Spasm appears in from a few seconds to one and one-half minutes and gradually increases. The spasm becomes very intense in patients with tetany, so that one can with difficulty separate the thumb from the palm. In simulated tetany, it is relatively easy to pull the thumb away from the palm and to demonstrate an active contraction on the part of the patient. The test is also of value in judging the effect of treatment; (3) one may obtain further evidence of the increased excitability of the motor nerves by demonstrating the increased excitability to electrical stimuli (Erb's phenomenon).

*Differential diagnosis of the type of tetany.*—Tetany may result from a number of causes, the more common of which may be grouped as follows:

- 
1. Parathyroid tetany { spontaneous  
post-operative
  2. Tetany occurring in certain disturbances of nutrition associated with
    - (a) rickets;
    - (b) osteomalacia;
    - (c) sprue and steatorrhœa.
  3. Tetany (usually transient) associated with the rapid development of alkalosis:
    - (a) gastric tetany: following upon repeated vomiting with the loss of hydrochloric acid, dehydration, and alkalosis;
    - (b) hyperpnœa with tetany following upon over-breathing and rapid blowing-off of carbon dioxide. This may occur in hysterical patients, in nervous patients following mental shock or fright, and in patients with acute upper respiratory disease.
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This syndrome is essentially the same in all types and the fundamental disturbance always appears to be due to a decrease in the number of calcium ions in the body fluids. In parathyroid tetany and tetany associated with the nutritional disturbances mentioned, the condition is chronic and the serum calcium is decreased. In tetany associated with alkalosis the condition is of short duration, although it may be recurrent, and the serum calcium is normal. There may be combinations of the different types. For instance, in a patient with parathyroid or nutritional tetany the symptoms may be aggravated by repeated vomiting or by over-breathing. In all types the symptoms may be immediately relieved by the intravenous administration of calcium chloride. It is easy to recognize gastric tetany and the tetany following upon over-breathing by the associated symptoms.

If there should be any doubt, the presence of a normal serum calcium indicates that the case belongs to this group. The syndrome disappears as soon as the alkalosis is corrected. The nutritional types are usually recognized by symptoms of the nutritional disorder, notably, the presence of rickets in infants; changes in the bones in osteomalacia; large fatty stools in sprue and steatorrhœa. The serum calcium is low and the serum phosphorus, instead of being high as in parathyroid tetany, is usually low.<sup>2</sup>

The diagnosis of parathyroid tetany is obviously easy when the syndrome appears after a subtotal thyroidectomy and then goes on to a chronic state. Spontaneous or idiopathic parathyroid tetany is to be recognized by the gradual onset of a chronic tetany associated with a low serum calcium and high serum phosphorus and by the absence of nutritional disorders of the types that may be associated with tetany. By far the commonest form of chronic tetany in adults is post-operative parathyroid tetany.

*The treatment of parathyroid tetany.*—In the acute attack, whether at the onset or at any time in the course of the disease, intravenous administration of 10 c.c. of a 5 or 10 per cent solution of calcium chloride will give immediate relief. It should be given slowly, great care being taken that none of the solution passes into the tissues about the vein, where it may cause a slough. The patient feels a sense of warmth all over the skin while the calcium chloride is being given, the muscles in spasm relax, paræsthesiæ disappear, and a feeling of greater well-being returns at once. Although the serum calcium quickly falls to a low level after such administration of calcium chloride, the patient will commonly feel fairly well and free from tetany for hours and even days afterwards. If spasms recur, calcium chloride should again be given intravenously. If attacks recur constantly in spite of the ingestion of a high calcium diet and added calcium, then the administration of parathormone intramuscularly or intravenously, in doses of 10 to 50 units daily, is helpful. It results in a gradual rise in the serum calcium with relief of the symptoms of tetany. In an emergency parathormone is not so valuable as the intravenous administration of calcium chloride, because of its slower effect. But because the higher calcium level is sustained for several hours and because it may be maintained for considerable periods by a daily

dose, it is a very valuable treatment at any time when severe spasms are recurring frequently. Parathormone is, however, expensive and, moreover, it may cease to be effective and, indeed, may become quite inert<sup>3</sup> when its administration is continued over long periods of time. It should, therefore, be used only as a temporary measure during periods of frequent recurrent severe attacks. It should be given in the smallest doses that will give the desired effect and should always be accompanied by a high calcium intake, because ingestion of large amounts of calcium greatly augments the effect of parathormone.

In all cases and at all times the patient should be given a high calcium diet—1 quart of milk daily, abundance of eggs and leafy vegetables—augmented by the ingestion of calcium salts. Calcium chloride in doses of 15 to 30 grains, given always with food, three to six times a day, is of great value. Being potentially an acid salt, it is more effective in relieving tetany than is calcium lactate or calcium gluconate which have, however, the advantage of being more easily taken and less apt to upset the stomach. If calcium lactate be used, even doses of 30 to 60 grains three to six times a day may fail to produce the same effect as the smaller dose of calcium chloride. Many patients are almost completely relieved by such calcium administration, which forms the basis of all treatment. In some cases the dose of calcium chloride or lactate may be reduced while the patient continues to take a high calcium diet. In others, while the patient continues to take large amounts of calcium salts, it may be necessary to give calcium chloride intravenously or to use parathormone from time to time.

In any disease characterized by a disturbance of calcium metabolism it is obvious that an adequate amount of vitamin D must be present in the diet. Tetany associated with rickets or osteomalacia is cured by administration of ordinary curative doses of vitamin D. Following the administration of large amounts of irradiated ergosterol to one patient with post-operative tetany and to two patients with idiopathic parathyroid tetany, Bauer, Marble and Claffin<sup>4</sup> demonstrated an increase in the serum calcium to normal with relief of the tetany. Similarly, at the Toronto General Hospital, we have noted in two cases of post-operative parathyroid tetany an increase in the serum calcium to normal,

with complete relief of tetany, following upon the ingestion of huge doses of irradiated ergosterol. The amount used was, however, so large that its expense at current prices would be prohibitive. Such treatment is, moreover, still in the experimental stage.

It is important that the patient be kept in the best possible state of mental and physical health. As already mentioned, malnutrition, infection, fatigue, worry, unhappiness, all aggravate the condition. Fortunately, a diet rich in dairy products, eggs, and leafy vegetables is likely to lead to a good state of nutrition. If there is hypothyroidism, thyroid extract<sup>2</sup> should be given in adequate amounts—usually 1 to 3 grains a day. Definite foci of infection should be removed if possible. Patients with tetany need encouragement, interest, increased rest in a quiet environment, and sleep. Whenever it is possible for the patient to continue at work it is well that she should do so. Any interest or part-time occupation is helpful. There is a strong tendency for the patient to become introspective, discouraged, tired of all things, without hope. An active interest and encouragement on the part of the physician does much to prevent and relieve such mental states. Explanation to give her an understanding of her condition is also important. The administration of bromide (6 grains 3 or 4 times a day) with or without a small dose of luminal (gr.  $\frac{1}{4}$  to  $\frac{1}{2}$ ) is helpful at times.

#### HYPERPARATHYROIDISM

Just as gross parathyroid insufficiency gives rise to the clinical picture of tetany, so prolonged hyperparathyroidism gives rise to the disease, generalized osteitis fibrosa cystica. This disease, described by Von Recklinghausen in 1891, is a chronic condition characterized by rarefaction and softening of the bones, with multiple areas of cystic degeneration, going on to gross deformity of the skeleton, usually with multiple fractures. In 1926, Mandle<sup>5</sup> reported a case of generalized osteitis fibrosa relieved by the removal of a parathyroid tumour. Since that time similar cases have been reported in all parts of the world<sup>6 to 10 et al.</sup> and hyperparathyroidism has come to be recognized as the underlying cause of the disease.

*The clinical picture.*—The disease occurs in both men and women at all ages, but most commonly in middle life. It frequently begins



with generalized weakness, thirst and polyuria, which may be present for some time before the appearance of symptoms and signs definitely referable to the bony system. Most patients, however, complain early of pain in the bones, particularly in the back, pelvis, and legs. Numerous fractures occur spontaneously or on slight injury. Deformities of the skeleton appear and slowly progress. These deformities are of the type that are commonly seen in conditions associated with softening of the skeleton. The head tends to become large and is held in a position of flexion; the spine is distinctly shortened due to narrowing of the vertebral bodies. There results a broad kyphotic dorsal curve, a loss of several inches in height, a chest with a deep antero-posterior diameter, and a shortened abdomen. Various irregularly curved deformities of the legs, pelvis and arms appear. Walking becomes difficult, then impossible. Great muscular weakness and atonia are commonly present. In some cases renal calculi follow upon the prolonged greatly increased excretion of calcium in the urine. The appetite fails, nausea and vomiting and occasionally abdominal cramps occur; the patient becomes extremely weak and may go on to a cachectic state with extreme deformity and helplessness and, finally, to a fatal termination. In only a relatively small proportion of cases can a tumour be felt in the neck.

*X-ray examination* shows a generalized rarefaction of the bony skeleton, with numerous cyst-like areas in the bones and marked deformity. A notable feature, important in distinguishing the condition from Paget's disease, is the relative absence of new-bone formation.

*Calcium and phosphorus metabolism.*—The blood calcium is increased to levels above 12 mg. per 100 c.c. and blood phosphorus is characteristically low. Calcium and phosphorus excretion in the urine is very great, so that there is a negative calcium balance even when the calcium intake is large. The blood phosphatase is increased. The calcium metabolism, as described, is essentially similar to that occurring in normal people after administration of the parathyroid hormone.<sup>3</sup>

*Pathogenesis.*—The essential feature of the condition is the disturbance in bone metabolism following upon overfunction of parathyroid tissue, which may usually be found in an adenomatous mass, sometimes in an anomalous posi-

tion. Turnbull<sup>9</sup> notes that the appearance of the parathyroid body suggests a hyperplasia and exceptional functional activity rather than an autonomous neoplasm—a condition analogous to that of the thyroid gland in Graves' disease. Associated with the chemical changes so characteristic of hyperparathyroidism are great changes in the architecture of the bone. There is evidence of great resorption of bone associated with active apposition (laying down of bone) and accompanied by fibrosis (Turnbull); tumour-like masses of osteoclasts and cysts are also found. In general, resorption greatly preponderates over apposition and marked rarefaction and softening of the skeleton results.

*Diagnosis.*—Generalized osteitis fibrosa cystica is to be distinguished from other chronic diseases that give rise to softening and deformity of the skeleton with or without multiple fractures. We shall consider: (1) osteomalacia; (2) Paget's disease; (3) fragilitas ossium; (4) multiple myeloma, and multiple secondary carcinoma involving the bones.

*Osteomalacia* is a deficiency disease due to lack of vitamin D, an adult rickets. It occurs almost entirely in females, during and following pregnancy, occasionally at puberty, and rarely at other times. The onset with pain in the bones, weakness, muscle atonia and deformity of the skeleton, may resemble that of hyperparathyroidism. Repeated fractures are, however, rare. Radiograms show a marked rarefaction, usually without cysts. The serum calcium is found to be normal or even below normal, and this finding in itself is nearly sufficient to rule out hyperparathyroidism, even in a relatively quiescent state. On taking a careful dietary history one is led to suspect the presence of osteomalacia, and this diagnosis is confirmed by the prompt improvement that follows upon administration of vitamin D.

*Paget's disease* is a chronic disease of the bones that affects both sexes, beginning in middle life in one or several parts of the skeleton, and gradually progressing over a period of many years to a final condition of great deformity. The first sign may be an enlargement of the skull so that a larger hat is required, or a thickening and curving of one or both tibiae, or pain in the hip from changes in the pelvis. There is a gradual loss of height due to affection of the spine. In contrast to both hyperparathyroidism and osteomalacia, the initial changes

that direct attention are usually associated with an increase in size of the bone, and this increase in size remains a prominent feature throughout the course of the disease. It is especially notable in the x-ray film, which shows great increase in size of most of the affected bones, with a peculiar and characteristic moth-eaten appearance due to the association of areas of rarefaction with areas of increased calcification. With the progress of the disease in the skull, various cranial nerves are affected and deafness and loss of the sense of smell are highly characteristic later symptoms of the disease. Fractures are relatively infrequent and occur chiefly in the tibiae. The serum calcium is normal or slightly decreased; serum phosphorus is normal; and excretion of calcium and phosphorus is not increased. The most important differential features are:— the gradual onset with a tendency to localization in certain special areas; the preponderance of apposition over resorption of bone, so that the affected bones become large; the characteristic moth-eaten appearance of the radiograms; the involvement of the cranial nerves; and the normal values for blood calcium and phosphorus and excretion of these elements.

*Fragilitas ossium* is readily recognized if a careful history is taken. It is a condition characterized by an extreme fragility of the bones so that repeated fractures occur on slightest trauma. A leg or an arm may be fractured at birth and x-ray pictures taken at that time may show that fractures have occurred *in utero*. Fractures are very frequent in the early years and become less common towards and after puberty. Considerable deformity frequently results. The bones are small and delicate. X-ray films may show considerable rarefaction without either cysts or excessive new formation of bone. Serum calcium and phosphorus are normal, as is the excretion of calcium and phosphorus.

*Multiple myeloma* and *multiple secondary carcinoma of bone* will seldom be confused with any of the above mentioned conditions. Neither of these diseases gives rise to the type of deformity mentioned above as characteristic of those diseases in which there is chronic softening of the skeleton. They may, however, give rise to pain in the bones associated with general loss of health and strength, and there may be shortening of the spine following upon fracture of vertebral bodies. Secondary carcinoma, even when multiple, is not uniformly generalized and

the history or signs of a primary growth, especially in the breast or prostate, will indicate the nature of the disease. Multiple myeloma may be very widespread, but it seldom gives rise to much deformity. The x-ray picture is usually fairly characteristic, and the serum calcium and phosphorus are normal.

*The treatment of hyperparathyroidism.*—The only satisfactory treatment of hyperparathyroidism is the surgical removal of the parathyroid adenoma. This is, however, more easily said than done. Owing to the fact that the adenoma often has an anomalous position, it may be found with great difficulty, sometimes only after repeated searching on different occasions. Removal of the adenoma is followed by a prompt relief of the pain in the bones, by an early appearance of transient tetany, and by a more gradual return of general strength and health, by disappearance of bone tumours, if present, and by gradually increasing density and greater strength of the skeleton.

#### SUMMARY

Disorders of the parathyroid gland may be divided into two groups: hyperparathyroidism, giving rise to the clinical picture of generalized osteitis fibrosa cystica; and hypoparathyroidism, characterized by chronic tetany.

Hyperparathyroidism, due to hyperplasia of parathyroid tissue in the form of an adenoma, is characterized by high serum calcium, low serum phosphorus, greatly increased loss of calcium and phosphorus from the bones, rarefaction and softening of the skeleton, great deformity, pain in the bones, multiple fractures, weakness, and finally cachexia. Treatment by surgical removal of the parathyroid adenoma prevents further progress of the disease, and results in relief of the symptoms and restoration of the calcium metabolism to normal.

Hypoparathyroidism, usually following upon a subtotal thyroidectomy, gives rise to a state of chronic tetany associated with a low serum calcium, high serum phosphorus and manifested by muscular spasms, paræsthesia, general weakness, fatigue, mental changes and the tendency for the development of cataracts. Treatment consists of the administration of a high calcium diet, abundantly adequate in vitamin D, with added calcium chloride or calcium lactate; the administration of 5 to 10 per cent calcium chloride intravenously in acute attacks; and the

use of parathormone occasionally when attacks recur frequently in spite of other treatment.

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## OSTEITIS FIBROSA WITH MULTIPLE BENIGN GIANT-CELL TUMOURS

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THE literature contains frequent references to the association of osteitis fibrosa (previously known as osteitis fibrosa cystica) with benign giant-cell tumour, both in regard to their cause and their pathology. Several authorities believe that benign giant-cell tumours are sequelæ of osteitis fibrosa. The case described below is unusual in that areas of osteitis fibrosa were associated with benign giant-cell tumours.

## CASE REPORT

Mrs. H., aged 44, sustained a fracture of the left femur in an automobile accident in 1930. While being transferred to hospital it was noted that the patient suffered but little pain, although the femur was obviously fractured. Radiographic examination revealed a comminuted fracture below the middle of the shaft (Fig. 1). It also showed a fracture of the left tibia extending across the shaft in the region of an ovoid rarefied area. In addition to the above findings tumours could be felt over the right clavicle and the lower part of the right femur. Radiograms were made of the osseous system. The tumour over the right clavicle was about the size of a small orange. The skiagram of this area showed that the shaft of the clavicle was expanded and studded with rarefied areas. A tumour mass about the size of a large grapefruit involved the lower end of the right femur, patella and knee joint. The right leg was adducted to an angle of 45 degrees, with the knee joint fixed. The x-ray examination revealed a large tumour mass involving the lower end of the femur (Fig. 2). There was evidence of an old fracture through the tumour which had united at an abnormal angle. During the previous year (1929) the patient had suffered a fracture of the right femur while changing her position in bed. At the site of this fracture a tumour mass was then discovered. An x-ray examination was made at that time and it was concluded that it was a pathological fracture due to bone sarcoma. The patient remained in bed for six months, during which time the fracture united. She was attempting to go about when the automobile accident referred to above, occurred.

The generalized radiographic examination showed in addition to the above, extensive bone lesions, which were as follows: (a) a pathological fracture of the

right ulna through a cystic area of the bone (Fig. 3); (b) right tibia contained multiple bone cysts. The right fibula shows a tumour mass cystic in appearance projecting into the soft tissues and surrounded by a considerable degree of periosteal reaction. (This is unusual in that the tumour appears to be sub-periosteal (Fig. 4); (c) a large bulbous tumour with almost complete destruction of the terminal phalanx of the right thumb (Fig. 6); (d) an expansile multicystic tumour of the proximal phalanx of the right ring finger; (e) small areas of bony rarefaction in several phalanges of the left hand; (f) a tumour of the right pubic ramus and of the ischium with cell spaces and trabeculae suggesting a giant-cell tumour (Fig. 7); (g) fibrocystic appearance of the head of the right and left humeri (Fig. 8); (h) a moth-eaten furry appearance of the whole skull (Fig. 9); (i) an epulis of the left mandible; (j) cystic tumours of the eighth, ninth and tenth ribs on the left side near the angles; (k) left tibia with bone cyst.

**Physical examination.**—A well nourished woman of middle age; weight 150 pounds, para-iv. Blood pressure, 150/70, red blood cells 3,800,000; white blood cells 8,000; hæmoglobin 70 per cent, blood smear negative, serum calcium, 6.6 mgrm. on one occasion and 6 at another examination; albumin 1 plus. The abdomen was pendulous, with gall bladder incision from drainage of gall bladder six years ago. Otherwise the physical examination was negative. Careful urinalysis suggested a Bence-Jones albumose reaction on one occasion, but this could not be confirmed. She had periodic temperature of a swinging type, reaching 102° in the afternoon, for a period of three weeks.

A modified Thomas' splint was placed on the left leg with traction, using her weight for counter-traction. The diagnosis at the time suggested multiple myeloma, and in order to make a definite diagnosis the right clavicle was cut down upon under a local anæsthetic and a small portion of the bone (2 cm. by 1 cm.) was removed. The bone and periosteum were exceedingly vascular. Biopsy by Dr. James Miller, Professor of Pathology, of Queen's University, Kingston, showed the tumour, after decalcification, to contain numerous giant-cells in a matrix of spindle-cells, in which occurred extensive hæmorrhage. The diagnosis was giant-cell tumour. Following this report, x-ray treatments were given over the right clavicle and the right femur. Within three months after the second treatment considerable decrease in size was noted. Subsequent to x-ray treatment radiographic examination showed callus



formation and bone regeneration in the rarefied areas in the fracture area. It was impossible to control this leg in extension, and slight overlapping resulted.

Recently the patient began to experience severe shooting pains down the left arm radiating to the fingers. Suspecting new growth, her neck was x-rayed, and an extensive polycystic tumour was noted in the body of the fifth vertebra (January, 1932). At the present time (August, 1932) this tumour may be felt surrounding the fifth spinous process. Radiograms show that there is complete destruction of the bodies of the third, fourth and fifth cervical vertebra with forward bowing of the oesophagus, causing dysphagia (Fig. 5). At the present time the other tumours have become definitely smaller and inactive. No evidences of cord compression have as yet resulted.

#### OSTEITIS FIBROSA

Some points in the incidence and pathology of osteitis fibrosa may be discussed as they tend to throw some light on its relation to benign giant-cell tumours. New concepts of this condition have recently been propounded; so that it will be well to review the situation. Osteitis fibrosa was first described by Von Recklinghausen in 1891 as characterized by the formation of fibrous connective tissues in bone, which in the majority of cases give rise to cysts. This condition, like benign giant-cell tumour, has a doubtful origin, some being of the opinion that it is inflammatory, others neoplastic. The presence of benign giant-cells in both conditions suggests an inflammatory basis, similar cells being found in tuberculosis and gummata. Moreover, the intermittent septic temperature found in these cases of benign giant-cell tumours, including the present one, supports this view. Other causes which may be considered are defects of calcium metabolism, as well as occasionally adenomata of the parathyroids, as described by Dawson and Struthers who have investigated the pathology of osteitis fibrosa.

Osteitis fibrosa occurs in early life, in the majority of cases between ten and twenty, and is characterized by pain, swelling and pathological fracture with softening of the bones and bending of the arms and legs. The femur, tibia and humerus are most commonly involved, and to a lesser degree the jaw and skull. All these regions are involved in the present case. Localized lesions are most common, but generalized lesions while very rare were found in 4 cases out of 69 in Bloodgood's series. Cystic spaces are clearly shown by the x-ray, and pathological fracture may appear.

The case under discussion presents cysts with pathological fracture in the left tibia and right ulna. According to Boyd,<sup>1</sup> the development of

benign giant-cell tumour is fairly common after osteitis fibrosa has been present for some time. Certain views as to the pathology and development of this condition have been suggested. That it is due to a bone resorption by the process of halisteresis and absorption of lacunæ by the osteoclasts, leaving a clear substance which is termed the "mother substance." Vascular loops and thin fibroblast cells are laid down. With extensive involvement, as in osteitis fibrosa, the fluid content of the cyst is usually hæmorrhagic and dark brown. These cysts may contain a gelatinous material. A further process may be shown by the formation of new bone by the osteoblasts with a deposit of calcium islands in the tissues. Groups of osteoblasts become fused and form a giant-cell within a previously cystic area, which may become filled with a variable amount of blood.

It has been shown that giant-cell tumours may arise from the wall of a cystic space in osteitis fibrosa. In the present case the multiple giant-cell tumours appear to arise in this way, as the accompanying x-ray shows them in different stages of development. Geschickter notes that these lesions are found most often in a sub-cortical location and this asymmetrical position is characteristic of both early giant-cell tumours and early bone cysts.

#### GIANT-CELL TUMOUR

For some time this condition was called giant-cell sarcoma, but as sarcoma indicated malignancy it would seem unwise to cause a confusion of these distinct conditions by the use of similar terms. Then again it has been called giant-cell myeloma or myeloma. Kolodny,<sup>2</sup> from the Registry of Bone Sarcoma, instituted by Codman, classified it as benign giant-cell tumour. Giant-cells may be of three types—first, those found in rapidly growing malignant tumours where the cytoplasm cannot grow as fast as the mitotic division of the nuclei. Here the nuclei are in no great numbers. These are, according to Mallory, true giant-cells; second, the foreign-body cells found in tuberculosis and syphilis; third, those found in giant-cell tumour. Here the nuclei in the central part of the cell are completely separated and of equal size. These giant-cells may be found in osteitis fibrosa, so-called "epulis", and in giant-cell tumours. Nelaton, in 1863, gave a very full description of this tumour and called it myeloid sarcoma.



FIG. 1.—Fracture of shaft of left femur, sustained in motor accident. Subsequent examination led to diagnosis of pathological fracture.

FIG. 2.—Tumour mass in the condylar region of right femur, showing multicystic appearance.

FIG. 3.—Pathological fracture of right ulna. Note line of fracture is through a bone cyst.

FIG. 4.—Bone cyst of right tibia and tumour mass in fibula.

FIG. 5.—Increased destruction of cervical vertebra taken six months after first observation.

FIG. 6.—Right hand showing large bulbous thumb and expansile multicystic appearance of proximal phalanx of ring finger.

FIG. 7.—Showing tumour of pubic rami and of ischium with typical cell spaces and trabeculae of giant-cell tumour.

FIG. 8.—Osteitis fibrosa of the head of the left humerus.

Previously it was not generally understood as a benign lesion either clinically or radiologically and on account of this many limbs were unnecessarily sacrificed.

**Pathology.**—The growth of these tumours depends upon the fact that the tumour tissue cells, which may be osteoclasts constantly destroy bone, while the osteoblasts, which are found *beneath* the periosteum and not *in* it, lay down an advancing shell of new bone. The tumour invades the shaft, leaving a few bony bridges running in various directions which act as supports for the central part of the tumour and which give the characteristic appearance. On pressure there is noted an egg-shell crackling. There is so much hæmorrhage that the typical maroon colour is present on section. The outer edge of the tumour meets the shaft of the bone at or near a right angle, thus differing in the skiagram from that seen in osteogenic sarcoma. In the latter condition the edge of the tumour merges into the shaft at an obtuse angle, and there is periosteal lipping at this point, due to the increased calcium stasis. (This calcium stasis is always found in locations of greatly increased blood supply, such as in osteomyelitic areas). When the lines of calcium deposit which are laid down near the large blood vessels in the giant-cell tumours fail to support the body weight, fractures result. After fracture the outer periosteum is broken and the tumour may invade the soft tissues. Therefore, in contrast to the early involvement in osteogenic sarcoma, spread to the soft tissues is late in giant-cell tumours. An exploratory incision may break down the periosteum leading to tumour growth in the line of incision. The tumour does not involve the joint cavities to the same extent as osteogenic sarcoma, but has a tendency to follow along the lines of the cruciate ligaments of the knee joints. Geschickter and Copeland,<sup>4</sup> believe that the bone cyst, a form of osteitis fibrosa, is an arrested giant-cell tumour. They explain it by the fact that the healing power of the bone cells declines with the advance of age; therefore bone cysts are more numerous in younger life and giant-cell tumour is more prevalent in later years. It is known that the giant-cell tumour has a bone-destroying function which is really due to the proliferation of osteoclasts. The giant-cell tumour of the skull forms around the cartilaginous centres of ossification.

Trauma in giant-cell tumour is spoken of as an initial event causing disruption which results in an unbalance between osteoclastic growth in the medulla and a reaction in the compact bone of the cortex. Disturbances of the calcium and phosphorus metabolism would appear to inhibit the normal growth and defensive reaction in the cortical bone. In the present case the persistent low blood calcium may have this effect.

Behring,<sup>5</sup> found that in 6 cases of giant-cell tumour out of 27 operated upon death resulted from metastasis. It seems that the disputed question of whether giant-cell tumours are wholly benign should be left open.

**Diagnosis.**—The consensus is that the diagnosis of benign giant-cell tumour should be made on physical findings and x-ray features, and that it is not always necessary, and is sometimes inadvisable, to resort to removal of a specimen for microscopic examination. Ewing<sup>3</sup> refers to border-line giant-cell tumour showing a wide destruction of bone, with an absence of bone cells, containing unusually large giant-

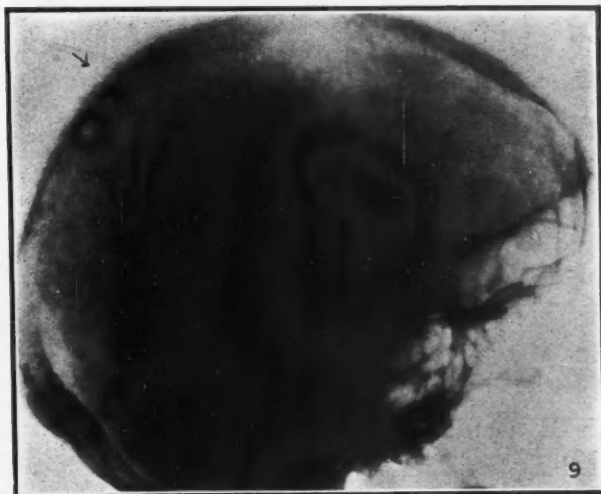


FIG. 9.—Note generalized "moth eaten" appearance of the skull and also epulis of the mandible.

cells with larger and more hyperchromatic nuclei. To be positive, however, a competent history, thorough physical examination plus satisfactory radiograms, will suffice for accurate diagnosis in the majority of cases, and will leave the unusual cases open for microscopic examination. The most frequent error is in mistaking the condition for osteomyelitis, which probably is not less frequent than mistaking it for osteogenic sarcoma. Because of the long duration and slow progress it may be mistaken for tuberculous osteomyelitis, especially when situated above the knee-joint. The radiological



picture of giant-cell tumour shows the multicystic appearance, as before stated, with a loss of continuity of the shaft, and the cortex seems to be distended and thinned out, but leaving a sharp margin which separates the tumour from the soft tissues.

Osteitis fibrosa may be confused with benign giant-cell tumour when the condition extends far along the shaft, but the former is not accompanied by expansion of the bone in a transverse diameter. In the histology of the condition the presence of giant-cells should not form a basis for diagnosis alone, as the type of supporting tumour cell is most important. A fact not sufficiently realized by the occasional examiner of bone tumours is that giant-cells may sometimes occur in osteogenic sarcoma.

#### TREATMENT

The treatment of this condition resolves itself into one of two courses. In the single lesion good results have been obtained by thorough curettage and carbolization of the interior of the tumour. This may or may not be followed by the inlay of a bone transplant, which course will be determined by the function of the part. Others have used zinc chloride with good results. Packing the cavity with gauze may lead to

infection and should not be done, as fatal hæmorrhage has occurred on the removal of the packing. The limb should be immobilized to prevent pathological fracture. To prevent recurrence radium or deep x-ray therapy is recommended. Radiation has been used for many years, and experience has shown that the surgical treatment of the tumour followed by radiation results only in a 20 per cent recurrence. A certain amount of danger is involved in employing radiation too soon after operation, as a local breaking down of the skin may follow, with subsequent infection. During recent years roentgen-rays or radium are being used instead of operative methods, especially in The Memorial Hospital, New York. During the early months the tumour may increase in size under radiation but this increase is soon followed by a shrinking of the growth and a formation of a new dense bone. In multiple cases such as the present one, radiation would appear to be the only possible line of attack.

#### REFERENCES

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### A COMPARATIVE STUDY OF HUMAN OVA\*

By P. J. KEARNS, M.D., M.Sc.,

*Royal Victoria Montreal Maternity Hospital,  
Montreal*

THE accidental finding of a young human blastocyst in the early stages of embedding in the mucosa of the uterus on May 6, 1932, stimulated us to make a comparative study of the more commonly known human ova, namely; Peter's, Bryce-Teacher's, Kleinhan's, and Miller's.

The specimen was obtained by curettement, during a sacro-pubic hernia repair, from a patient 47 years of age who had had twelve previous pregnancies; the last two years ago. Her menstrual habit was regular; menses began at 15, came on every 30 days and lasted 5 days. The last period ended on April 6, 1932, and there had been no further bleeding. She was admitted to the hospital on May 3, 1932, and was operated upon early on the morning of May 6th. She admitted coitus on the evening of April 25th and on May 2nd, the day before admission to the hospital.

\* Read before the Montreal Medical Chirurgical Society on April 7, 1933.

According to our present knowledge, ovulation occurs mid-way between the periods. The ovum travels through the tube to the uterus in about three days. This has been demonstrated by Corner from experiments on the sow. The spermatozoa propel themselves from the cervix to the ampulla of the tube in from three to four hours. (Hartman and Ball<sup>1</sup> claim that in the rat spermatozoa travel to the cornua of the uterus in two minutes). Experiments upon monkeys show that the fertilized ovum may remain in the uterus for three or four days before implantation takes place. These accepted views change our ideas concerning the time factors associated with the ovum within the uterine cavity and as an embedded blastocyst.

The method of embedding of the fertilized ovum varies in different types of animals. Among the insectivora, such as the hedgehog, and the rodents, as mice and rats, the ovum is received into a fissure or recess of the mucous lining of the uterus. The epithelium disappears and the mucous membrane thickens and surrounds the ovum by a fusion of the lips of the decidua.

Graf von Spee has shown that the ovum of the guinea-pig is embedded in a similar manner to that of the human, that is, by destroying the surface epithelium at the spot where it is implanted and then, by a continuance of the destruction by solution of the surrounding cells, embeds itself in the connective tissue of the mucosa. The presence of uterine epithelium is not necessary for the process of embedding, as was shown by Catherine van Tussenbroek in ovarian pregnancies.

Older authors computed the age of ova by the conventional method of His, namely, the external and internal dimensions of the blastocyst, the days omitted from the last period, and the nature of the omitted period. This is unsatisfactory, because such ova as Peter's and Bryce-Teacher's were dead, cast off by hæmorrhage behind them, and dehydration must have occurred. The different fixing methods have also a comparative shrinkage value. There may also be slight discrepancies in the measurements owing to the sections not being made through the proper alignment of the blastocyst, as shown in Leopold's and our own ovum.

A comparative study of the anatomical arrangement of the blastocyst and the surrounding tissue reaction is of more practical importance. It is from this latter view, a histological differentiation of tissues, that I wish to report this finding, not as one experienced in embryology.

Let us now proceed to discuss the various ova mentioned, taking Peter's first.

#### PETER'S OVUM

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The *Gewebsspilz*, or closing gap, is devoid of decidua, but has blood-clot and fibrin. This is pathological. This ovum represents a stage in which the necrotic zone has disappeared and the plasmodial strands of anchoring villi are replaced by cytotrophoblastic processes, or permanent villi. There is a mingling of fetal and maternal tissues. We know that the placental circulation is complete or active at the end of the third week, 21 days, therefore this ovum must be about 19 days old because permanent villous structures are being formed.

#### THE BRYCE-TEACHER OVUM

This ovum was found by Dr. Teacher<sub>2</sub> in a specimen of blood-clot and urine sent to him by Dr. T. Douglas Brown in November, 1907. The blood-vessels of the decidua are dilated. There is a blood cushion in the deep aspect of the blastocyst. This ovum, however, was dead, having been cast off from the uterus; therefore it is pathological, like Peter's ovum. To summarize the findings here.

1. The blastocyst is completely enclosed in decidua, except at one small point which is filled with blood-clot. This appears to be pathological.

2. The ovum is bathed in blood. There is no interlocking of the maternal and fetal tissues.

3. The innermost layer of the decidua shows advanced coagulation necrosis, and there is a secondary zone of polymorphonuclears and leucocytes.

4. The wall of the blastocyst consists of an inner lamella of cytotrophoblast, but this is continuous with the outer plasmoditrophoblast. The villi are plasmodial, not attached.

5. The cavity of the blastocyst is filled with a delicate tissue having the characters of mesenchyme.

6. The embryonic rudiment shows no distinction between embryonic and amniotic ectoderm, while Peter's does show a differentiation of this rudiment into embryonic ectoderm of the floor and amnion of the roof.

7. The calculated age of the ovum, from coitus, is 16½ days.

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picture of giant-cell tumour shows the multicystic appearance, as before stated, with a loss of continuity of the shaft, and the cortex seems to be distended and thinned out, but leaving a sharp margin which separates the tumour from the soft tissues.

Osteitis fibrosa may be confused with benign giant-cell tumour when the condition extends far along the shaft, but the former is not accompanied by expansion of the bone in a transverse diameter. In the histology of the condition the presence of giant-cells should not form a basis for diagnosis alone, as the type of supporting tumour cell is most important. A fact not sufficiently realized by the occasional examiner of bone tumours is that giant-cells may sometimes occur in osteogenic sarcoma.

#### TREATMENT

The treatment of this condition resolves itself into one of two courses. In the single lesion good results have been obtained by thorough curettage and carbolization of the interior of the tumour. This may or may not be followed by the inlay of a bone transplant, which course will be determined by the function of the part. Others have used zinc chloride with good results. Packing the cavity with gauze may lead to

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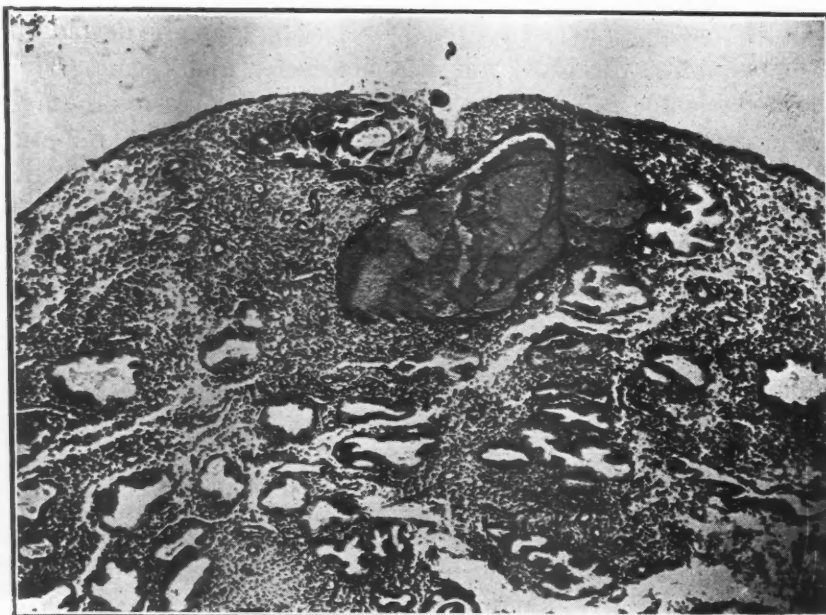
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EMBEDDING OF BLASTOCYST—KEARNS' OVUM

FIG. 1.—Low-power magnification. The endometrium is in the pre-menstrual phase and the ovum is penetrating into a raised portion of the endometrium. Note the blood sinus close by.

report of the blastocyst in relation to the corpus luteum. The specimen was received healthy and there is a definite history of menstruation and coitus.

This ovum represents the stage of formation of trophoblastic lacunæ; also shows a localized formation of decidua about the immediate vicinity of the ovum.

The ovum is perfect in having an embryonic rudiment, properly sectioned. The age of the ovum is calculated from a regular cycle of 24 days and a late pre-menstrual endometrium. This determines the ovum to be 10 or 11 days old.

The ovum measured 0.6 mm., that is, five times the size of a human egg, therefore the size of the penetrating blastocyst must be about the size of a normal unfertilized ovum, because the blastocyst has been embedded in the endometrium about three or four days.

#### KEARNS' OVUM

1. An exact clinical history of menstruation and coitus was obtained. The calculated age of the ovum is taken from the date of coitus and tissue changes in the endometrium. The en-

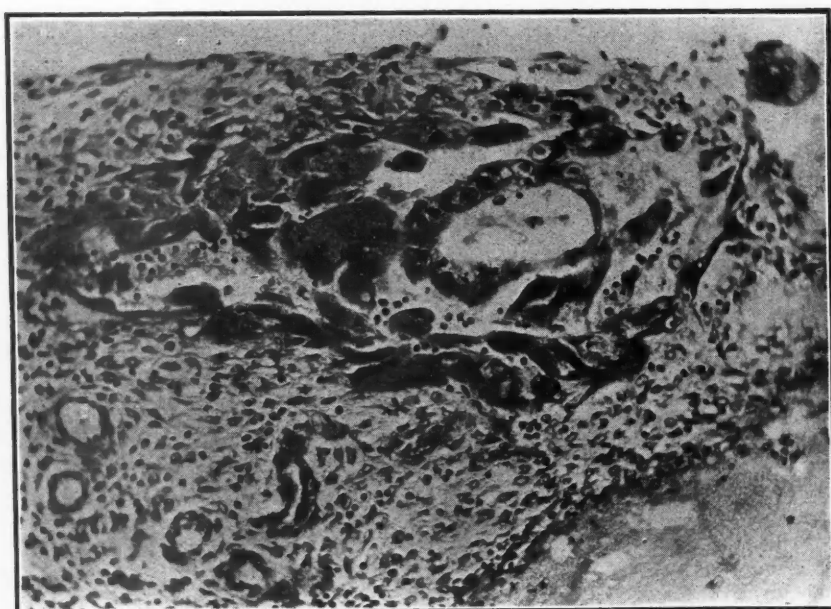
dometrium is in the late pre-menstrual phase. This makes 13 days from the middle of the last period and 10½ days from the time of coitus on April 25th. The age of this blastocyst is then assumed to be from 10 to 11 days.

2. The blastocyst, like Leopold's ovum in 1906, does not show an embryonic rudiment. Therefore it is imperfect.

3. There is an immediate localized decidual reaction about the blastocyst, and a large distended blood sinus laterally placed. This places the ovum between Kleinhan's ovum, which has syncytial lacunæ filled with blood, and Miller's ovum, which has less tissue reaction about it.

4. There are localized areas of thickening along the surface of the mucosal epithelium, possibly due to the presence of the blastocyst before embedding. This has been demonstrated in the uteri of monkeys in the immediate region of the blastocyst.

5. This specimen confirms the theory that the blastocyst preferably embeds in the pre-menstrual mucosa, and that the site of the em-



EMBEDDING OF BLASTOCYST—KEARNS' OVUM

FIG. 2.—High-power magnification. This shows the ovoid shape of the ovum, the solution of surface epithelium at the point of entrance, and the early decidual change in the vicinity of the blastocyst.

bedding is in a raised portion of the surface of the endometrium.

6. The solution of the surface epithelium of the uterus is beautifully shown.

7. A parallel is formed by this blastocyst with that seen in the region of recently embedded metastatic areas of chorio-epithelioma, namely, a globular aneurysmal cavity nearby.

8. It appears, from observation, that the human ovum, like that of the guinea-pig, embeds after dissolution of the zona pellucida, and this occurs about seven to eight days after the fertilization of the ovum.

9. From examination, it appears that to facilitate penetration the blastocyst is ovoid when entering the surface endometrium, and only assumes a globular shape after embedding.

I present this specimen in the hope that the embryologists may further study the blastocyst and prove it to have greater value, from an embryological standpoint, than I have been able to demonstrate. It is interesting to compare the anatomical arrangement of the cells in the blastocyst with that reported in Quain's Anatomy of Tarsius Spectrum. (After Hubrecht).

I am grateful to Dr. Geo. L. Streeter,<sup>3</sup> Director of the Department of Embryology, Carnegie Institute, Washington, for explaining to me certain embryological points concerning young human ova; to Mr. Wallace J. Plumptre for the technical study of this specimen.

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## RELAPSING FEVER IN NORTH AMERICA, WITH REPORT OF AN OUTBREAK IN BRITISH COLUMBIA

BY J. H. PALMER, M.D. AND D. J. M. CRAWFORD, M.D.,

*Trail-Rossland Clinic,*

*Trail, B.C.*

BRUSSIN and Schapiro<sup>1</sup> conclude from their studies that the various forms of relapsing fever, as found in Africa, Europe, Asia and America, are due to spirochaetes developed from a single parent strain which have acquired different antigenic properties owing to different local conditions. Nicolle and Anderson<sup>2</sup> also found that all known strains are closely related. The African form of the disease, which is the most severe and has the highest mortality, apparently does not occur outside that continent. The European form has been prevalent on the Continent and in Ireland since early in the eighteenth century, especially during periods of war and famine. The causative spirillum was first discovered in the blood of a patient in 1868 by Obermeier, and described by him in 1873. Clinically, the disease which is endemic in tropical America and which has appeared in the United States is identical with the European form, although *Sp. novyi*, which is responsible for the American form, shows biological characteristics differing somewhat from those of *Sp. obermeieri*. It is the occurrence of the disease in North America that particularly interests us in this communication.

The first introduction of relapsing fever into this continent appears to have been by Irish immigrants in 1844 at Philadelphia, when Clymer<sup>3</sup> recognized it in 15 cases under his care, all of whom crossed the ocean in the same vessel. The study of another 15 cases was reported in 1848 by A. Dubois. Clymer mentions that it is stated in a report from the Russian government to the British Ambassador at St. Petersburg that the disease was said to exist at New Archangel (now Sitka, Alaska) in 1858. Austin Flint saw the disease in 1850-51, and in 1870 published a lecture based on his experiences with the disease in the wards of the Bellevue Hospital. To his article was appended a statistical report of 103 cases by T. J. Moore. In 1869 the disease appeared in epidemic form, chiefly in New York and Philadelphia, continued throughout that year and the next, gradually disappearing in 1871; a few cases were found in the city of Washington, in Maryland, in New Jersey and in Connecticut; one case was imported into Boston. Osler<sup>4</sup> mentions this epidemic, adding "since when it has not reappeared." In September, 1874, a severe epidemic was observed at Oroville, Calif., among Chinese



labourers. This epidemic resembled both typhus exanthematicus, or ordinary typhus fever, and typhus recurrentis, or relapsing fever. It was probably the latter, but there is no conclusive evidence. Ward reports a case in an Armenian in Worcester, Mass., in 1899. However suggestive clinically, the diagnosis was not confirmed by blood examinations. Carlisle, in reporting 2 cases in May, 1906, was the first in the United States to record having found the spirochæte of relapsing fever in the blood. The origin of one of his cases was undoubtedly tropical America; the other was an accidental infection of a laboratory worker from an inoculated monkey.

At the annual meeting of the Colorado State Medical Society, held on October 5, 1915, Meader<sup>5</sup> presented clinical histories of 5 cases of relapsing fever contracted at Bear Creek Canyon, Col., in 2 of which he found the spirochæte. It is to be noted that these are the first instances of the disease originating among native Americans in North America in which the spirochæte was demonstrated in the blood. In 1918 Waring<sup>6</sup> reported another case from the same region, microscopically confirmed. Since then Briggs<sup>7</sup> recorded in 1922 two cases: a man and his wife in whom the infection was acquired at Polaris, on the Truckee River in California. The next cases were reported in 1930 by Weller and Graham<sup>8</sup>—4 boys of about 16 years of age who contracted the disease while exploring a cave in the Colorado River Valley in central Texas. Bannister<sup>9</sup> reported a case in 1930 in a native Canadian male, a resident of Arizona. Fernan-Nunez, in 1931, reported a case from Wisconsin; this patient, however, flew from Panama only five days prior to the attack.

From the foregoing it will be seen that the disease has been microscopically proved in less than a dozen native Americans.

Epidemiological data on the geographical distribution of this fever, provided by the League of Nations,<sup>10</sup> as well as a search of contemporary and early literature, fail to reveal a single reported case from Canada. The following cases, constituting the first Canadian outbreak, are therefore presented and would tend to show that the disease is already endemic in British Columbia.

All of our patients appear to have contracted the disease while summering on the north-east shore of the lower Arrow Lake region. Only

two of the cases were knowingly in contact with each other, and it will be noted that the locations of their different camps are several miles apart. There is no road between Deer Park and Syringa Creek, communications being by boat only. The whole district is sparsely settled, except for a few small farms along the shore.

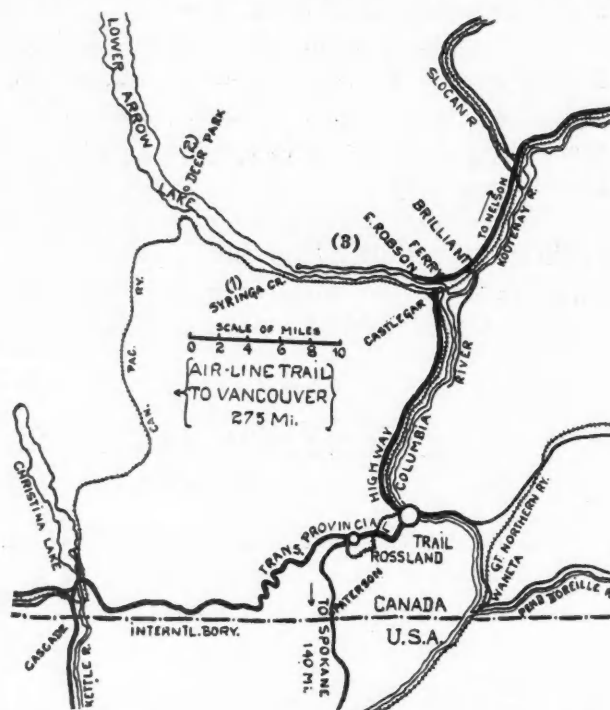


FIG. 1.—(1) Cases 1 and 2, located at Syringa Creek.  
(2) Cases 3, 4 and 6, located at Deer Park.  
(3) Case 5, located 5 miles west of Castlegar Ferry.

Scattered along the lake between Robson and Syringa Creek are perhaps a hundred summer camps belonging to families from Trail. The district is "off the beaten track" and thus free from transients.

#### CASE 1

C.B., aged 27, a male, smelterman, born in Ireland, came to Canada in 1926 and had been in Trail ever since. He had spent the week-end of June 25, 1932, at Syringa Creek, fishing. The illness commenced the morning of June 30th, with a chill. He was admitted to the Trail-Tadanac Hospital the same afternoon, complaining of severe frontal headache, chilliness, backache, and pains in the calves and thighs. His temperature was 104°, his pulse 110. At the end of 12 hours the temperature fell to 99°, the fall being accompanied by a drenching sweat. During the next 48 hours the temperature ranged between 99° and 104.6°, rising on two occasions to the latter figure. With each of the two rises there was a rigor, followed by a drenching sweat when the peak was reached. For the remainder of his stay in hospital, which totalled a week, the temperature and pulse were normal. Although he felt rather weak, he complained of no discomfort, and was discharged feeling quite fit. Physical examination revealed nothing abnormal beyond a moderate increase in the size of the spleen.

Exactly one week after the temperature had settled down to normal there was a complete recurrence of his

first attack, which, however, was shorter by about 12 hours. It was in this second attack, while the temperature was rising, that we were able to demonstrate the presence of spirochaetes in fresh unstained specimens of blood, and in films stained by Wright's stain, and thus to identify the disease as relapsing fever. Agglutination tests for typhoid, paratyphoid and *Br. abortus* were

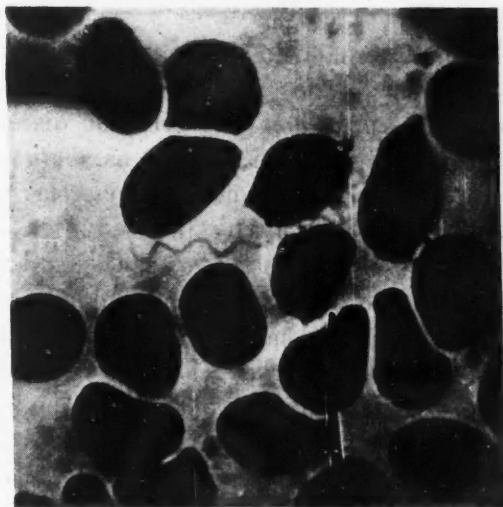


FIG. 2.—Spirochaetes in blood, Case 1.

all negative. At the height of the attack the leucocytes numbered 17,000 per c.mm.

The patient refused to have novarsenobenzol administered, and suffered two subsequent attacks, each separated from the previous one by a week, and each one lasting a shorter period than the previous one. After his fourth attack he was becoming quite weakened and decided that if he had another, he would allow us to administer the arsenical. He had no more, however, and regained his former health in a comparatively short time.

#### CASE 2

J.N., a schoolboy, aged 10, born in Canada, had been staying at Syringa Creek for a month prior to becoming ill. On July 27, 1932, he complained of headache and of feeling cold and shivery. The following day he was considered ill enough to be brought to Trail. He continued to be feverish and to have chilly sensations and profuse sweating; when seen on July 31st his temperature was 104°. Physical examination was negative, except for a tender spleen which could be palpated one inch below the costal margin. On August 1st the temperature was normal, and the patient was apparently well until the second attack, which occurred on August 5th, the temperature becoming normal the next day. Subsequent relapses occurred on August 12th, 19th, 26th, September 2nd, 9th, and 15th. In all of these the original symptoms of headache, chilliness and sweating were exhibited, and the temperature reached between 103° and 104°. None of the attacks, however, lasted twenty-four hours, and in the last three the temperature was normal in less than twelve hours from the onset of symptoms.

When seen for the first time this case was suspected to be one of relapsing fever, and attempts were made at this and subsequent relapses to discover the spirochaete, but were unsuccessful. One intravenous dose of 0.1 gm. of novarsenobenzol given on September 2nd was apparently too small, but no further attacks followed after 0.3 gm. on September 15th.

#### CASE 3

L.B., a female, aged 15, born in Canada, was employed as a house maid at the summer home of patient C.D. for a month prior to illness. On August 11, 1932, she complained of feeling ill and was sent home to

Rosslund. On August 13th her symptoms became severe, with backache, nausea, chills, sweating, and a temperature of 105°. She remained in bed until August 18th, when her symptoms and fever subsided. On August 20th she became suddenly ill again with the same symptoms as on August 13th, and again on August 27th another attack took place. These last two attacks, however, lasted only one day each, and no more occurred. She was seen by a physician only during the first attack.

#### CASE 4

C.D., a male, accountant, aged 30, born in Canada, had been at Deer Park for 10 days prior to becoming ill. On August 14, 1932, he developed a severe headache, aching in the back and limbs, and chilliness, with a temperature of 102.6°. The following day he was feeling somewhat better, but was taken to Rosslund, where he was admitted to the Mater Misericordiae Hospital. On August 16th, the temperature and pulse fell to normal. During this attack the white blood cell count was 10,000. Physical examination was negative, except for slight jaundice. The spleen could not be palpated. The patient was discharged on the 18th, and returned to work on August 22nd.

On August 24th the second attack occurred, with the same symptoms, except that jaundice was absent. It lasted two days. Subsequent attacks occurred on August 28th, September 1st, 4th, 8th, 11th, and 18th, each one being shorter and milder than the previous one. During the attack on September 18th spirochaetes were found in the stained blood smear. On September 25th an attack, rivalling in severity the initial one, with a temperature of 102° occurred. Following the injection of 0.3 gm. novarsenobenzol intravenously on September 26th the temperature fell to normal and no more attacks occurred. Agglutination tests for typhoid, paratyphoid, and undulant fever were made at the time of the first attack and again later in the course of the disease, and were negative. Distressing features of this case were the severe headache and insomnia which accompanied the attacks. No definite rigors occurred, but chilliness and sweating were common.

The diagnosis in the next case was not made until a year after the patient had been ill, when the similarity to the foregoing cases was recalled. On purely clinical grounds it seems justifiable to include it as a case of relapsing fever.

#### CASE 5

J.A.P., a male, aged 24, smelter employee, born in British Columbia, had had no previous illnesses. His illness began while at camp, five miles west of Castlegar ferry, on July 22, 1931, with general malaise, chilliness, and pain under the left costal margin. He was admitted to the Trail-Tadanac Hospital on July 23rd. During the next four days the patient had several severe chills with drenching sweats, headache, nausea and some vomiting, and a foul odour to the breath. His temperature on admission was 103°, pulse 110, and after daily morning remissions the temperature subsided to normal on July 26th. The temperature rose again to 103° on July 29th, with the same chills and sweating, becoming normal again on August 1st. The white blood cell count on July 31st was 5,000. Succeeding attacks occurred on August 3rd, 15th, and 20th, the first lasting two days, and the last two one day each. In each case the temperature reached 103°, and chills and profuse sweating occurred. During the afebrile periods the patient felt comparatively well and free from symptoms. Physical examination was negative, except for an enlarged spleen which was quite tender, and extended three inches below the costal margin. This had become practically normal in size by September 5th. Blood cultures and agglutination reactions for typhoid, para-

typhoid and *Br. abortus* were negative. Several unsuccessful examinations of the blood for malarial parasites were made, but no spirochæte was seen during the search.

The next case dates back to 1930. The patient was seen during his first three attacks by one of our colleagues, who in 1932 recalled the resemblance to the microscopically proven cases.

#### CASE 6

R.B., a male, aged 23, medical student, the brother-in-law of patient C.D. He spent the week of August 1 to 7, 1930, at Deer Park, at the house occupied in 1932 by Cases 3 and 4, after which he returned to Rossland. On August 13th he took to his bed complaining of mild chills, general malaise, and severe aching pains in the legs and back. His temperature was 102° to 104°. After about four days the temperature fell by crisis to normal, the fall being accompanied by drenching sweats. He felt quite well until August 22nd when the same train of symptoms occurred, with a temperature rise to 105°. He was able to be up on August 27th, and on September 5th the third attack occurred. Two days later he returned to Montreal, where he had three more attacks, making six in all. The interval between attacks was about a week each time, and the later ones were not as severe as the first. After each attack he felt quite well until the temperature rose again. No blood tests of any kind were carried out.

#### CLINICAL FEATURES

The above cases exhibit the main clinical characteristics of the European type of disease. The incubation period of relapsing fever is given as from one to ten days, most often five to seven; and the onset is usually abrupt. The first febrile period may last from three to ten days, but in most cases it is terminated after a week by an abrupt fall in temperature. After an afebrile interval of from three to eight days a second attack, similar to the first, but shorter and less severe, occurs. At least two more attacks are the rule, but more may take place. The afebrile interval is from five to seven days, and the severity and duration of successive attacks become less. An erythematous eruption sometimes occurs, but this was not noted in any of our cases. The spleen is usually enlarged and tender. Other physical signs may be wanting. Complications are rare, and in otherwise healthy patients the mortality is low, not above 4 per cent.<sup>11</sup>

#### DIAGNOSIS

The diagnosis is made by finding the actively moving spirochætes in fresh blood specimens during the febrile period, or after staining by Wright's stain in the ordinary manner. In cases where this method fails to reveal the organism white mice or rabbits may be inoculated with suspected blood, the blood of the animal

being subsequently examined daily for ten days.

For treatment the intravenous use of novarsphenamine or a substitute organic arsenic preparation is specific. It should however be given during a febrile attack.

#### VECTORS

The question of the method of spread is a very important one. It is generally recognized that *Spirochæta duttoni* of the African disease is spread by the tick *Ornithodoros moubata*. The European form on the other hand seems to be spread almost entirely by the body louse, although the bedbug appears to take a hand when permitted to do so. Bates, Dunn and St. John<sup>12</sup> have satisfactorily demonstrated that the human tick, *Ornithodoros talaje*, is the transmitting agent of relapsing fever in Panama. The habits of this tick resemble very much those of the bedbug. Waring<sup>6</sup> in commenting on Meader's cases says: "It is probable that a band of gypsies mentioned by Meader brought the disease into Colorado and stopped at the tent where Meader's patients resided, leaving behind infected body lice. Granted this, it follows that the descendants of these pediculi either retained infecting ability from the summer of 1915 until the summer of 1917, a very remote possibility, or other unrecognized cases have come and gone and the said descendants have had opportunity for receiving their infected store of spirochætes." In the cases of the husband and wife reported by Briggs<sup>7</sup> it is stated that they were probably bitten by some suctorial insect, presumably a bedbug or a tick, although this cannot be proved; a great many tramps are found in the area of California mentioned, and there are great opportunities for dissemination of vermin. Graham<sup>13</sup> is inclined to believe that *Ornithodoros turicata* is responsible for his central Texas cases; this tick is found from central Texas southward through Mexico, Central and South America.

As to the manner in which the disease organisms are implanted in the human being, Nogouchi,<sup>14</sup> in an exhaustive consideration of spirochætes says: "In the case of *Spirochæta recurrentis*, both body lice and bedbugs may be infected by sucking the blood of a patient suffering from the European relapsing fever, but the lice alone can transmit the disease to the next person they bite. Bedbugs are never known to spread the infection by their bites, although



by crushing the infected bugs directly over a minute skin trauma (scratch, etc.), a person may become infected." As regards *Ornithodoros moubata*, Leishman<sup>15</sup> believes that infection proceeds not from the salivary glands, but owing to the fact that the infected excrement voided by the tick while feeding is carried into the wound made by the bite. Leishman has further shown that tick ova may become infected and young ticks be thus born infected. There is no reason to believe that these facts do not hold good for American ticks.

Coming now to our British Columbia cases, we have been able with practical certainty to rule out the louse and bedbug as vectors. There remain ticks, which are notoriously common in this part of the Kootenays. In reply to a request regarding the various species present in British Columbia, which attack human beings, Arthur Gibson,<sup>16</sup> Dominion Entomologist at Ottawa, writes: "The paralysis tick (or wood tick), *Dermacentor andersoni* Stiles (*venustus* Banks). This is the species that most commonly attacks man in western North America. It is apparently the only tick implicated in causing tick paralysis in man and wild and domestic animals in British Columbia. It is abundant in the Dry Belt areas of British Columbia and in southwestern Alberta. It was reported as unusually abundant in 1932. Its range extends from the United States boundary to at least 100 miles north of Kamloops, and it appears to be most numerous in the Kootenay district. It is only occasionally present in the wet coastal belt of British Columbia. It is considered one of the most injurious ticks in Canada.

"*D. andersoni* is the vector of rocky mountain spotted fever (in the western United States) and also transmits tularemia. This tick also causes tick paralysis of humans and animals.

"The castor bean tick, *Ixodes ricinus* L., attacks man as well as many wild and domestic animals. Reported from the Pacific Coast region

of British Columbia in 1932, causing ulcers in man."

It is noteworthy that the bite of the wood tick is usually painless, and we have encountered cases in which an area of gangrene was forming around the bite, or in which tick paralysis was already developed, without the patient being aware that a live tick was still *in situ*. It is our belief that in the cases which are now reported the wood tick has been the vector. It is confidently expected that more cases will appear this year, and we hope that, if such should happen to be the case, it will be possible definitely to prove or disprove this theory.

#### SUMMARY

A review is made of the cases of relapsing fever which have been reported in the literature as occurring in North America. Until now no cases have ever been reported from Canada, and the outbreak in British Columbia which is here recorded appears to show that the disease is already endemic in the West Kootenay district. Spirochaetes were found in two of the cases reported here.

The problem of transmission is discussed, and the hypothesis advanced that the vector here is the wood tick (*Dermacentor andersoni* Stiles).

We are greatly indebted to our colleagues, Drs. Topliff and Daly, of Rossland, for the histories and findings in cases three and four respectively.

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Motion pictures showing how ultra-violet light of certain wave-lengths kills cells were shown before the recent meeting of the American Chemical Society by Dr. Ellice McDonald, Alexander J. Allen, and Rachel Franklin of the University of Pennsylvania. They used cells from the spleen for their experimental material, and the wave-lengths turned on them ranged between 4350 and 2253 Angstrom units. The wave-lengths that

were fatal to the cells killed in from fifteen to twenty seconds. The living protoplasm of the cells became greatly agitated, bubbles appeared on the membrane, and as a rule the cells finally burst. The killing effect of the shorter ultra-violet light cannot be equaled by fifteen hours of exposure to strong radiation from radium, nor is the lethal effect of ultra-violet light equaled by twelve to twenty-four hours of exposure to high-voltage x-rays.—*The Diplomat*, 1933, 5: 129.

## Clinical Conferences

### POTT'S DISEASE

By J. A. NUTTER,

Montreal

A. B., aged 43, a pattern-maker, was admitted to the Montreal General Hospital complaining of: (1) pains in the back for 2 years; (2) weakness in the legs for 1 year; (3) inability to walk for 3 months; (4) inability to pass urine for 4 weeks.

*History of the present illness.*—Two years ago patient began to suffer from pains in the lower back and sides following exposure to cold on a hunting expedition. The pain is described as being like an electric shock. A few months later he noticed a numbness along the outer sides of his thighs. This was followed by hyperæsthesia of the legs from the knees down, the skin having become quite painful to the touch. Since the summer of 1931 he noticed his legs getting weak, to such an extent, recently, that his knees were likely to give way under him while he was letting himself down into a chair. By March, 1932, he was unable to walk at all. During these two years his weight fell from 195 to 175 lbs. While this was going on, he had also complaints referable to his genito-urinary tract. As a boy of 20 he developed a stricture, and at 27 was admitted to this hospital to be treated for that as well as for a prostatic abscess. Eight years ago he was treated for marked frequency. A sound was used and a false passage made. After some months of bladder lavage he recovered. At the time his backache developed he began to pass small friable particles of white stone, with pain and bleeding. During the past year urination has gradually become increasingly difficult, so that for the past month he has led a catheter existence, with the added difficulty that catheterization has been difficult as a result of the old stricture and false passage.

*Personal history.*—A Newfoundlander, he came to Montreal at 20, and has lived here ever since. He is said to have had epileptic fits in his sleep only for the first 25 years of his life, occurring at intervals of 5 to 10 years. He never bit his tongue. He had had typhoid

fever at 15. Otherwise the history was negative.

The *family history* was negative.

*Physical examination* (reported by a student).—Examination of the respiratory and cardiovascular systems and abdomen was negative, as was also the glandular system. The spine at the 11th dorsal vertebra is prominent, and jarring this causes radiating pains in the back. The x-rays reveal destruction of the disc and bone between the 11th and 12th dorsal vertebrae. Neurological examination reveals a mentally active, somewhat introspective patient with cranial nerves intact. The legs are definitely weak, though with little change in sensation. The right leg cannot be lifted more than a foot from off the bed. The left is stronger, though with approximately only one-tenth its normal power. Knee and Achilles' jerks were absent; Babinski reaction slight; Kernig's sign absent, but ankle clonus is present on both sides, especially on the right. The sphincter ani is intact, and trophic ulcers are absent.

TEACHER.—Was a lumbar puncture done?

STUDENT.—The pressure of the spinal fluid in the lumbar region was 120 mm. of mercury. Cardiac oscillations were not visible, while the respiratory movements caused a rise and fall of 2 mm. Coughing raised the pressure 20 mm.; which then fell slowly. Jugular compression on either side caused an immediate rise in the pressure, 10 mm. on the right side, and 40 mm. on the left. Bilateral deep jugular compression for 10 seconds raised the pressure to 350 mm., which after 40 seconds still remained at 320 mm. Removal of five c.c. of spinal fluid reduced the pressure from 350 mm. to 90 mm. The fluid itself was clear, with increased globulin and seven small monocytes to the high power field.

TEACHER.—How did you interpret these findings?

STUDENT.—As indicating complete physiological block of the vertebral canal and subarachnoid space, a block which can be broken down.

TEACHER.—The kidneys are not palpable or tender. There is no ureteral tenderness nor masses. The urethra allows the passage of soft rubber catheters (Fr. 14 and 16) as far as the prostate only. A Coudé catheter, No. 15, was

eventually passed into the bladder with great difficulty. There was a tight feeling all the way through the prostatic urethra. A soft rubber catheter was strapped in place and attached to a bottle. Skiagrams were negative as to kidney, bladder or ureteral calculus. Cystoscopy was done with some difficulty. False pockets on either side of the colliculus were seen, with moderate trigonitis. The mixed urine, specific gravity 1016, showed albumin with many pus and red blood cells, some epithelium and no casts. The urine from the left kidney (that from the right was not obtained) was normal, save for a few epithelial cells. The right kidney and bladder would therefore appear to contribute most of the urinary findings. The Wassermann test was negative. The urea nitrogen was 18, the creatinine 1.72.

TEACHER.—We have therefore a paraplegic condition of the legs, as also a bladder that is incapable of emptying itself, though not completely strictured. To afford good drainage of the purulent urine a retention catheter is being used. The patient's temperature does not exceed 100.2°; hence suprapubic drainage, fortunately, is not indicated. Have you a clue to the paraplegia?

STUDENT.—The level of the paralysis points to the dorso-lumbar region. Here we have a destructive process involving the 11th and 12th dorsal vertebræ, most probably of tuberculous origin (Pott's disease). This lesion is well known to cause paralysis of the legs.

TEACHER.—We have then a man with tuberculosis of the spine in the low dorsal region, complicated by cord pressure, resulting in paralysis of legs and bladder. This complication is a common one now, and was still commoner when Percival Pott described it. His original description is entitled "Remarks on that kind of palsy of the lower limb which is frequently found to accompany a curvature of the spine"—London, 1779. This paralysis occurs with particular frequency, probably in 15 per cent, when the tuberculous process is in the upper and middle thirds of the dorsal spine. It is possible that the cause of such frequency of paralysis at this level is due to two things—(1) the well-known difficulty of securing efficient immobilization here, and the consequent development of hunchback; (2) the vertebral canal is relatively small at this level. Pott's paraplegia is much more apt to appear in cases

such as this, where the vertebral disease went unnoticed and untreated. We notice one interesting feature here—that the paralysis led to the finding of the vertebral disease. Much more often the paralysis appears about 6 to 12 months after the Pott's disease has been recognized. The paralysis usually persists for several months—not infrequently for a year—and complete recovery is possible after as much as ten years. Recovery is the rule (in 90 per cent) with the great majority of cases efficiently treated. What causes the cord pressure and the consequent subarachnoid block so well demonstrated here?

STUDENT.—Actual bony pressure on the cord due to spinal deformity is rare. An extreme grade of hunchback may be present with but little diminution in the calibre of the vertebral canal. The tuberculous process gradually advances into the vertebral canal, filling it until the cord is pressed upon, and block ensues.

TEACHER.—Is this pressure due to an intraspinal abscess?

STUDENT.—I notice that the French put abscess in the front rank as the cause of paraplegia (Sorrel, Déjerine, Paris, 1925) though in this country the slow advance of tuberculous granulation tissue is held chiefly responsible.

TEACHER.—Calvé, of Berck, France, some years ago advised the use of a trocar to relieve intraspinal pressure by abscess. There is no doubt that any abscess in the neighbourhood should be emptied if it can be reached.

Interference with the conductivity of the cord is caused by the pressure. The pressure on the pyramidal tracts relieves from brain control the parts below the compression, resulting in weakness and spasticity. There is usually no loss of sensation nor bed-sores. The bladder function varies from the usual intermittent incontinence incident to an upper dorsal lesion to constant dribbling when the reflex centres are directly involved in the pressure. The patient walks with a weak, awkward and shambling gait, with increased patellar reflexes and ankle clonus. After a greater or less time walking becomes impossible.

The treatment of Pott's paraplegia is the treatment of the disease which produces it, of which the essentials are rest and fixation. The paralysis is not to be regarded as an unmixed evil. The patient, as well as his parents, is usually so terrified by the inability to walk that



prolonged rest can be enforced without protest. Hugh Owen Thomas, of Liverpool, the uncle of the recently deceased Sir Robert Jones, used to say, when paralysis occurred in the case of an unruly child, "Now we shall have a chance to get him well." In this case the paralysis has done our patient a great service by drawing attention to his diseased spine, as also by enforcing the rest which is so necessary for a cure. This patient was given a plaster shell in which to lie while a retention catheter was necessary. A speedy return of power both in the legs and bladder was noticed, and after a few weeks a plaster jacket was applied in which he now lies. Laminectomy was considered, but was thought unnecessary, owing to his rapid improvement.

The question of operative interference in Pott's disease demands consideration. As a routine treatment of paraplegia laminectomy is now out of favour. It is seldom necessary to perform this operation, the immediate mortality of which is not to be disregarded, for the relief of a paralysis which shows so high an incidence of spontaneous, though at times slow, recovery. Albee has advocated the spinal graft and Hibbs the fusion operation in all cases. It is possible

that this is unnecessary in many children, in the treatment of whom prolonged recumbency is usually obtainable. Adults as a rule demand operative fixation, either by the Albee or Hibbs method, followed by prolonged recumbency and fixation of the spine first by plaster, later by steel and leather jackets.

Our patient has remained on his back in a succession of plaster jackets for nearly a year. His legs have gradually returned to their normal strength, and after four months were apparently cured. His bladder has given him some trouble, owing to irritability, and his urethra has been dilated by sounds at least once. His peculiar back and leg sensations of electric shocks have gradually disappeared in the course of a few months. His skiagrams, taken at intervals, show no further extension of the disease, but rather a denser and healthier appearance of the vertebral bodies involved, and even a suggestion that the bony defect between the 11th and 12th dorsal is being filled in. For these reasons, and because he promised to stay on his back a year, an operation was not insisted on for the present. He will be allowed up in May, 1933, with a plaster jacket.

## Case Reports

### A CASE OF SMALL ALVEOLAR LARGE-CELL ADENOCARCINOMA (LANGHANS) OF THE THYROID GLAND\*

By E. M. EBERTS,

*Montreal*

The case which I have to present is that of a woman, aged 43, who was admitted to the Montreal General Hospital in June, 1930, complaining of enlargement of the neck, nervousness, palpitation, and loss of weight.

*Personal history.*—She had always lived in the Province of Quebec, latterly at Thurso on the Ottawa River, a goitrous region. Her menstrual history was normal. She was married at 24, and had had three children, the youngest being 11 years old. In childhood she had had bronchitis, chickenpox, whooping cough, and scarlet fever; at 27, measles; at 32, influenza;

at 42, diphtheria; and from time to time attacks of tonsillitis, the last at the age of 40. There had been no dental or pharyngeal infections. In 1915 I performed a radical operation for carcinoma of the right breast; there had been no recurrence. The patient had always worked very hard, and had not had sufficient hours of rest.

*Present illness.*—The swelling on the right side of the neck was first noticed at the age of 39. It had gradually increased in size, more rapidly during the year prior to admission. Toxic symptoms had been present for one year. Iodine, prescribed by the family physician, and taken during the latter months of 1929, had but aggravated the symptoms.

*Examination.*—On examination there was found in the right lobe of the thyroid an oval mass, 6.5 cm. vertically by 8.5 cm. transversely, freely movable, smooth, and firm in consistence. The usual signs and symptoms of thyrotoxicosis were present, namely, palpitation, marked tremor of the hands and tongue, nervousness,

\* Read before the meeting of American Association for the Study of Goitre, Hamilton, June 15, 1932, and published in somewhat altered form in the *Western J. of Surg., Obst. & Gyn.* The illustrations are reproduced through the courtesy of that Journal.

restlessness, irritability, sleeplessness, heat intolerance, sweating, weakness, and loss of weight. There were no eye signs. The pulse rate was 120; the blood pressure, 75/140; the basal metabolic rate, +68.

*Operation.*—Under amytal and local infiltration of the skin, enucleation resection of the encapsulated adenomatous mass was performed. Recovery was uneventful.

*Post-operative course.*—Eighteen days after the operation the basal metabolic rate was -1; the pulse rate, 70. There had been a gain in

alveoli. The individual cells were, for the greater part, polyhedral in shape, with rather small vesicular nuclei. Their cytoplasm varied considerably; in some cells it was opaque and eosinophilic; in others, clear and of a foamy appearance. In many places the cells resembled adrenal or liver cells. They contained neither fat nor glycogen. No mitotic figures were seen. There were numerous blood vessels, but none showed invasion. Although the areas of malignant disease were circumscribed and sharply demarcated from the parent adenomatous tu-

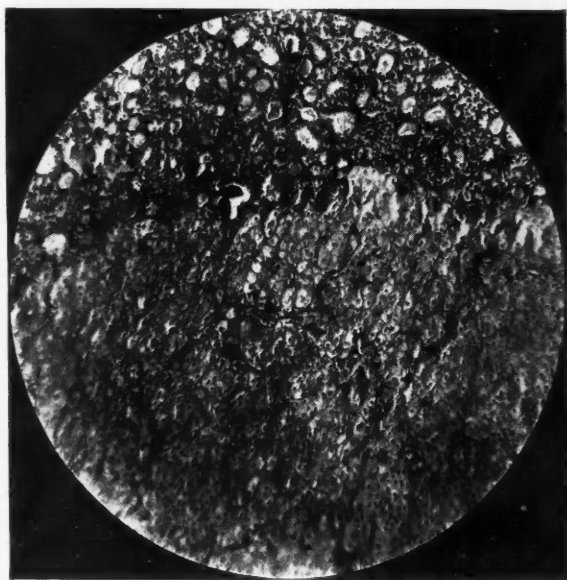


FIG. 1.—Low magnification, showing, above, normal-appearing thyroid tissue; below, the advancing malignant tumour. There are no infiltrating bands or cords. The line between thyroid structure and malignant growth is sharply defined. In many places the cells resemble adrenal or liver cells.

weight of 6½ pounds. At the end of three months the gain in weight was 35 pounds. Subsequent to operation deep x-ray treatments were administered at intervals over a period of about a year and a half. The patient has since remained free from symptoms referable to the thyroid.

*Gross and histological pathology.*—On gross section the specimen showed a thick fibrous capsule. For the greater part the tissue resembled normal thyroid tissue, but, interspersed throughout the mass, could be seen well-circumscribed areas of a lighter colour and a more solid glandular structure. Although the tumour was large, there were no gross degenerative changes.

On microscopic examination the nodules seen in the gross were found to be composed of large, closely-packed cells, arranged in small

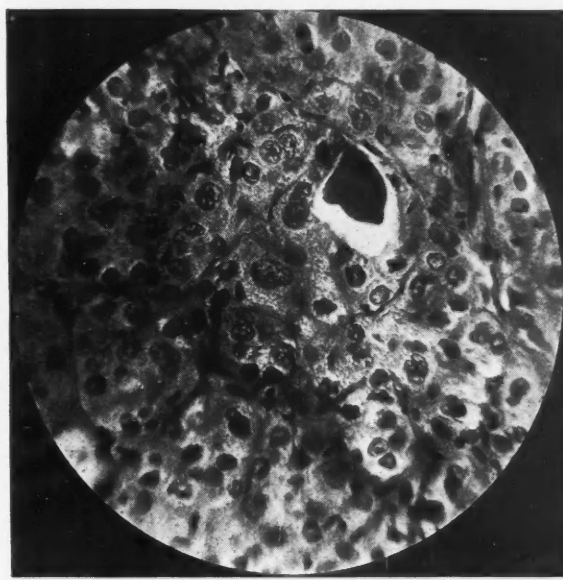


FIG. 2.—High-dry magnification, showing large tumour cells forming small alveoli. In one alveolus there is a collection of colloid. Note pale-staining nuclei and granular or foamy cytoplasm.

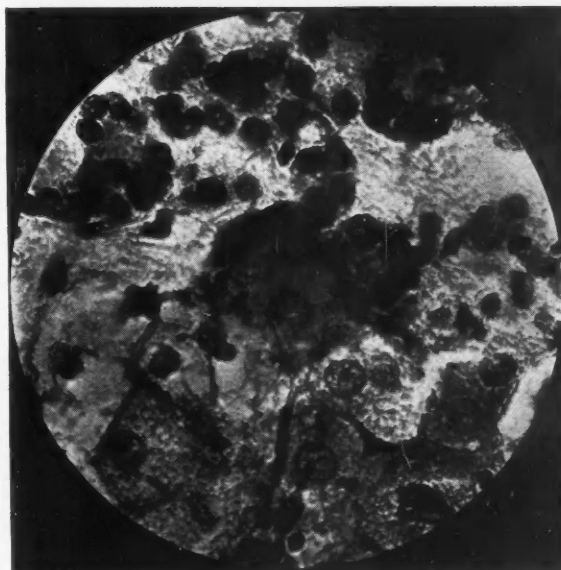


FIG. 3.—Oil-immersion, showing junction of tumour and thyroid epithelium. In the centre is an acinus filled with colloid, the upper half of its lumen being lined with cubical epithelium, the lower half with tumour cells.

mour, they were not encapsulated. The usual feature of infiltration—columns or strands of malignant cells pushing in between the normal-appearing alveoli—was absent. Nor were those tissues in contact with the malignant growth compressed or atrophied. The engrafted tumour had apparently in its advance directly replaced the contiguous adenomatous thyroid tissue. So striking was this feature that in some sections one could see one-half of the circumference of an acinus lined with normal-appearing cubical cells and the other half with tumour cells. Blood vessels were resistant, the tumour growing around them. There was also no leucocytic infiltration. Within the advancing malignant tumour were globules of colloid.

This tumour has been described by Getzowa as struma post-branchialis. It is more generally designated small alveolar large-cell adenocarcinoma (Langhans). Ewing states that he has seen two such tumours.

While the pathogenesis is obscure, it is possible that these tumours have their origin in Hurtle's cells of the thyroid alveoli. At all events, in the case here reported, the malignant process developed in a precursory adenomatous tumour of typical thyroid structure. Furthermore, the tumour cells were, as the illustrations show, capable of secreting colloid. These two facts would appear to establish definitely a thyroid origin. These tumours are said to metastasize through the blood stream, rather than by way of the lymphatics. If removal is effected before the capsule has been permeated, the prognosis is favourable.

In addition to the pathological aspects reported, there are two interesting clinical features in this case: (1) the development of a malignant process in a pre-existing adenoma, and (2) the associated hyperthyroidism.

#### A CASE OF ARACHNODACTYLY\*

By W. J. PATTERSON, M.D., F.A.C.S.,

*Assistant Surgeon, Royal Victoria Hospital and  
Shriners' Hospital for Crippled Children,  
Montreal*

The condition known as arachnodactyly was described first by Marfan,<sup>1</sup> of Paris, in 1896, under the name of "pieds d'araigée," or spider-feet. The present name was used first

by Achard,<sup>2</sup> of Paris, in 1902. The first case to be reported in America was that of Pyper and Irvine Jones, in 1927.<sup>3</sup> Between 1896 and 1929 twenty-two cases in all are in the literature, and to these Young,<sup>4</sup> of London, added 4 more, together with an excellent and comprehensive review of those previously reported.

The condition is a definite clinical entity, fetal in origin, and characterized by abnormal increase in length rather than in breadth of the bones, especially of the hands and feet, having associated with this a marked general dystrophy of the muscles, and a great laxity of the joint ligaments, together with other abnormalities.

Several theories have been advanced as to the etiology, but none of them have been definitely proved, nor do any of them give a complete and satisfactory explanation of the condition. Among these are, first, an endocrine disturbance, with the pituitary cited as the gland at fault. But as far as we know, pituitary disorder produces a state of gigantism which presents a picture widely at variance with that found in arachnodactyly, and resembling it in only a few minor points. Moreover, as yet, neither by x-ray, nor at post-mortem, has any conclusive evidence been produced in cases of arachnodactyly for any disturbance of the pituitary.

The next theory is that the condition is a primary muscular dystrophy, closely allied to amyotonia congenita, but certainly not identical with it. This theory has much in its favour, but it, too, unfortunately, is not susceptible of proof. The muscular system, in our case, is certainly the object of a generalized dystrophy, but there are no paralyses, nor does the theory explain the weird bony changes in the feet and hands. Heredity, or familial tendency has been noted in only two cases. Other theories such as Mongolism, hyperchondroplasia, and embryonic fault have been put forward but are completely unfitted as a solution for the condition.

I am not prepared to advance any theory of causation. The most complete investigation of this case by myself and by specialists in various lines of study has failed to add anything to our knowledge of this remarkable condition. I am, however, reporting the case because of its unusual interest, and in the hope that some information may be obtained thereby.

#### CASE REPORT

Our patient was a girl of 11 years of age, who came to the Shriners' Hospital for Crippled

\* Reported before the Montreal Medico-Chirurgical Society, on October 21, 1932.



Children in Montreal, complaining only of recurrent dislocation of both patellæ, but one glance at her (Fig. 2), was enough to show that there was much more at fault than the patellæ.

The family history was negative.

*Condition on admission.*—Our patient was  $59\frac{3}{4}$  inches tall and weighed  $68\frac{3}{4}$  pounds. The most striking feature in her case was that the hands and feet were abnormally long, while the phalanges in both were very slender. A very poorly developed muscular system was also strikingly apparent. More detailed examination revealed the following points.

The head was fairly normal in shape but dolicocephalic in type. The top of the skull

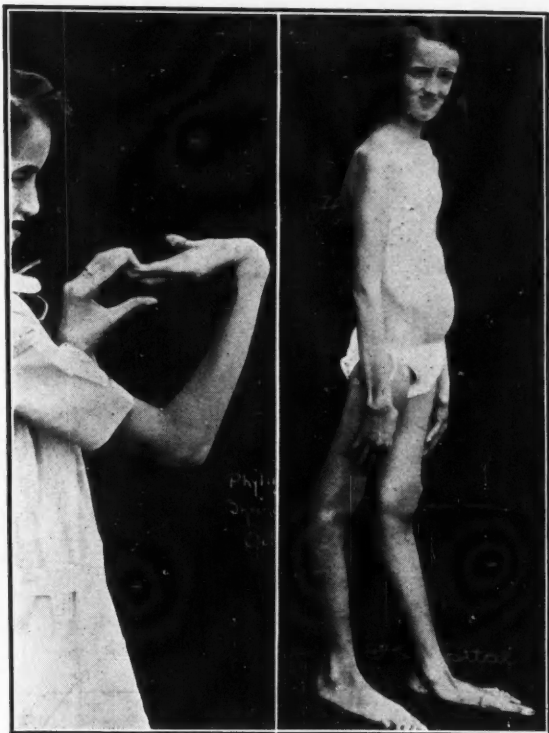


FIG. 1

FIG. 2

showed a linear ridge with a sloping downwards on each side from this to the parieto-temporal regions. The forehead was high.

The eyes were prominent, with an increase in width of the palpebral fissure, and showing an unusual amount of sclera. Vision was about two-thirds of normal, and the condition of dislocation of the lens referred to by other writers was not present in this case.

The face was narrow and pointed. The upper jaw protruded over the lower so that the teeth in the front of the lower jaw were quite one-half an inch posterior to those in the front of the upper jaw. The teeth were poor. The hard

palate and the roof of the mouth showed a very high arch. The nose was small and narrow, and the nostrils were thin. The ears showed no particular abnormality.

The chest was pigeon-breasted and the ribs extremely slender. The neck was long and extensible. The scapulæ were winged; the clavicles were very slender, and there was marked increase in mobility at the sterno-clavicular joints. One felt that one could snap the clavicles between one's fingers and dislocate them very easily at either of these joints.

The arms were long and slender, measuring 20 inches from shoulder to wrist. There was marked increase in mobility of both shoulder and elbow joints, and in the forearms and hands this increase in mobility was even more marked. The hands could be dorsi-flexed until the back of the hand and back of forearm formed an angle of about sixty degrees (Fig. 1). Palmar flexion was possible to thirty degrees and the tips of the fingers could be approximated to the palmar surface of the forearm. The head of each radius could be moved about very freely and could be dislocated with extreme ease.

The bones of the carpus could be rolled about under one's fingers, and the base of the thumb could be dislocated and replaced by the pressure of one finger. There was marked atrophy of the hands, especially on the palmar surface, involving both the thenar and hypothenar eminences. The hand was long, the palm being 4 inches in length and only  $2\frac{1}{2}$  in width. The fingers were long and very slender, the first finger, measuring  $3\frac{1}{2}$  inches, the second  $4\frac{1}{4}$  inches, the third 4 inches, and the fourth 3 inches. The phalanges of the thumb measured  $2\frac{1}{2}$  inches.

The spine was fairly straight, but there was a slight kyphosis in the dorso-lumbar region and a slight scoliosis; dorsal convex, left; lumbar convex, right.

The thighs did not present the same degree of under-development as noted in the upper limbs, and the lower legs were more or less normal in appearance, but there was a similar laxity of the ligaments at the hips and knees, and especially about the patellæ, which could be picked up in one's fingers, and practically turned inside out.

In the feet the same abnormal development was noted as in the hands. They were very flat, and measured 11 inches from the base of

the heel to the tip of the great toe. The width of the plantar surface was only  $2\frac{3}{4}$  inches and the circumference about the middle of the foot was only 7 inches. The bones of the metatarsus could be palpated and were longer and more slender than normal. The phalanges of the toes were extremely slender and unduly long. The great toe measured  $3\frac{1}{4}$  inches, the second  $2\frac{3}{4}$  inches, the third  $2\frac{3}{4}$  inches, the fourth  $2\frac{1}{2}$  inches and the fifth  $1\frac{3}{4}$  inches.

In the feet, as in the hands, there was increased mobility in all directions. The foot could be dorsi-flexed to 65 degrees, and plantar-



FIG. 3

flexed to 160 degrees. The most marked increase in mobility was seen in the tarsal region.

Mentality was good and quite up to, if not beyond, that of a child of this age.

Special examination of the urine, blood, nervous system, and metabolism failed to show anything abnormal. The blood pressure was a little low.

X-ray examination revealed the fact that there was nothing abnormal in the growth age-line, and, moreover, that the bones themselves were apparently of good consistency, and not thinned out or rarefied as one would expect (Fig. 3). The slender appearance was, therefore, due more to soft tissue impairment than to bone rarefaction or lack of growth. The skull plate did not show any abnormality of the

sella turcica, other than that it was perhaps more shallow than usual. The chest plate was normal.

No evidence of any other disease could be found. There were no enlarged glands. Yet the routine tuberculous intradermal test, which is given to all our cases, produced a most violent reaction, greater than I have ever seen in any case. Five other children were given the same dose of the same preparation on the same day, without any abnormal reactions, so that this, the only positive finding in our investigations, rather adds to our perplexity because of the absence of any evidence to account for it.

The heart was normal and the congenital lesion noted in other case reports was not present here.

There are, therefore, in this particular case the following points to be enumerated.

1. The increase in length of the long bones of the body, especially in the hands and feet.
2. The apparent normal structure of these bones on x-ray examination.
3. The marked laxity of ligaments in all the joints of the body.
4. The muscular dystrophy, with an absence of paralysis, generalized throughout the body.
5. The absence of congenital defects in the heart or eyes, as previously noted by other writers.
6. The absence of any hereditary or familial tendency.
7. The absence of any positive clinical or laboratory findings.
8. The excessive reaction to tuberculin in the absence of any determinable lesion.

NOTE: A full bibliography on this subject may be obtained from the author.

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#### A CASE OF OVARIAN FIBROMA

By J. H. DUNCAN, M.A., M.B.,  
Sault Ste. Marie, Ont.

Solid tumours of the ovary are comparatively rare. Fibromata are the commonest, and yet, according to Curtis,<sup>1</sup> not more than 200 have been reported in the literature up to 1930. The case to be reported was that of a very stout

multipara of thirty-five years of age who developed abdominal pain, chills and diarrhoea. The onset had been sudden, four days before she was seen. She was menstruating rather profusely and it was a week ahead of her



FIG. 1

expected period. She was not nursing her six months old baby. Her temperature was 102° and the next day 103° F.

She had much abdominal tenderness and a firm mass, which seemed to be about the size of a five months' pregnant uterus. After bimanual examination my impression was that she was not pregnant, but on account of the great thickness of the abdominal wall, I could not be sure that the mass was not connected with the uterus. After removal to hospital and getting a good night's sleep with morphia, she was so much improved that it was decided to await the subsidence of the acute process before exploring the abdomen.

She returned to the hospital in less than four weeks for operation. Tenderness was so much less that the mass could be defined much better than before. It seemed to arise from the left side of the pelvis and extend up to above the level of the umbilicus. It was quite firm and only tender at its upper extremity. The pre-operative diagnosis was in favour of its being an ovarian tumour, although it might also be a large pedicled uterine fibroid.

Laparotomy was performed under ether anaesthesia. In making the skin incision consideration was given to the desire of the patient to

reduce and so a transverse ellipse of skin and fatty tissue, weighing about two pounds, was removed, and then the peritoneum was incised vertically through the linea alba. A large white tumour mass presented with some wide flattened veins coursing over its surface. The upper pole was of an olive greenish hue, softer than the body of the mass, and was adherent to a loop of small bowel. With a little care this was separated and the raw surface of the intestine was covered by oversewing with catgut. The tumour was now delivered. It was about the size of a two years old child's head, and was attached by a narrow pedicle to the left cornu of the uterus. The pedicle which did not show any twisting was ligated and the mass removed. To prevent adhesions of the small bowel, the stump was covered with a fold of sigmoid. The abdomen was closed in the usual fashion. The patient's recovery was prompt and uneventful.

The gross specimen consisted of a large solid tumour, generally white and fibrous except at the softer, fluctuant, discoloured upper pole. The general appearance and dimensions are shown in Fig. 1. As it was suspended by the



FIG. 2

pedicle for photographing, it appears upside down. The pedicle includes the ovarian ligament, the Fallopian tube and the upper part of the left broad ligament. The ovary was spread out over the tumour which had developed within its intact capsule, so that a section cut from below up would go through first the



thinned-out ovary, next the hard fibrous tumour, and finally the soft hæmorrhagic upper pole.

A section was cut for microscopic study so as to include the ovarian substance and the tumour. This is shown in Fig. 2, made with the help of an ordinary microscope and a 3A Eastman kodak. This was described by the pathologist as follows.

"Microscopically, it is seen to be a tumour growth made up of well differentiated fibroblasts growing in whorls and fan-shaped masses. No mitotic figures can be seen. Collagen fibres are quite abundant and in many areas dominate the picture. The blood vessels are fairly numerous and well developed. Numerous areas of anæmic necrosis are seen, with various degrees of inflammatory reaction about them. The growth is clearly demarcated by a well defined capsule. Beyond this in one area can be distinguished a small portion of ovarian tissue with a corpus albicans in it. Diagnosis: fibroma of the ovary."

In concluding, it seems reasonable to speculate that torsion of the pedicle of this tumour occurred about a month before the operation, accounting for the fever and pain; that at this time also hæmorrhage occurred into the distal upper pole and the inflammatory reaction caused adhesion to the intestine. Then, probably when she was being moved to the hospital, spontaneous reduction occurred, with amelioration of the symptoms.

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### A CASE OF RAT-BITE FEVER

By H. PAUL MELANSON, M.D.,

Montreal

R.Z., a female, three years of age, was admitted to the Department of Pædiatrics, Royal Victoria Hospital on December 21, 1929, with an eruption of undetermined etiology which for three weeks had resisted empirical local treatment.

The history given by the parents was that the child had suddenly become ill on December 1, 1929. She awakened from sound slumber during the night crying, and was feverish. It was noticed that there was a reddish-blue discoloration of the skin about the angle of the mouth, extending outwards over the cheek. Other areas

of swelling and discoloration were present the following day, on the forehead, about the left eye, on the chest, and on the limbs. Local applications were given, and the fever subsided after twenty-four hours; except for the eruption which had persisted the child was apparently in normally good health. Any history of trauma, infection or intercurrent disease was denied.

*Physical examination* was essentially negative except for the integumentary system. The patient was a normally developed, well-nourished child, who was extremely irritable, and resented handling. The pulse, temperature, and respirations were normal on admission.

*Personal and family history* seemed quite irrelevant.

The skin lesions presented a problem in diagnosis. There was a small irregular healed scar at the angle of the mouth, surrounded by a raised area of bluish-red discoloration, which presented a sharply defined margin, deeply congested, fading to a bluish-purple towards its centre, and extending upwards over the malar prominence to the lower eyelid. There was a smaller area over the right frontal boss.

On both arms were several areas presenting similar characteristics, but surrounded by a secondary and, in some places, a tertiary ecchymotic areola. All areas showed some degree of induration or fibrosis in the centre. The lesions varied in size from one to five centimetres in diameter, and were warmer to the touch than the surrounding skin.

Urinalysis was normal. The blood Wassermann test was negative. Clinical blood examination showed a leucocytosis of 7,600, and a moderate grade of anæmia.

There was no change in the child's condition or appearance until December 27th, one week after admission, when the temperature, which had previously remained normal, suddenly rose to 104.3°. A leucocytosis of 22,000 was present. The eruption, which for one week had remained stationary, became more intensely injected. New macular areas appeared on the trunk and limbs and the regional glands became enlarged and tender.

At this time she was seen by Dr. H. B. Cushing, the Director of the Department, who suggested the probability of rat-bite fever infection. As a consequence blood was taken in 2 per cent sodium citrate solution, centrifuged

at high speed, and the supernatant plasma examined by dark field illumination. Mobile spirochætes of varying lengths were seen, as many as three in a field. Domestic rats were inoculated with the citrated blood and the organism was recovered in the rats' blood six days later.

The following day, December 29th, the temperature became normal and the intense injection of the eruption began to fade.

On January 2nd, blood again was examined, while the patient was afebrile, and the spirochæte was not found.

On January 5th, her temperature again rose to 104.3°, and new areas of eruption appeared. The existing discolored macular areas became inflamed, and bright red secondary areolæ developed around them. Citrated blood examined as before showed large numbers of spirochætes in the plasma and domestic rats were again successfully inoculated.

The diagnosis of rat-bite fever being satisfactorily established, 0.12 gms. of arsphenamin was given intravenously. The temperature fell to normal the following day, the eruption gradually faded, and no further exacerbations

occurred. Subsequent blood examination failed to reveal the spirochæte.

The parents, on being confronted with the diagnosis reluctantly admitted that the child had awakened during the night, six or seven days prior to the onset of symptoms with a laceration of the lip and wrist. She told them a rat had bitten her.

It is interesting to recall that one of the animal caretakers was badly bitten on the hand by one of the successfully inoculated rats, all of which had become quite rabid, and although he was carefully watched for two weeks, he failed to develop any symptoms of this disease.

This case is presented because of the apparent rarity of rat-bite fever in Canada, and particularly on account of the ease with which the diagnosis of this case was confirmed by the examination of the blood plasma taken during a paroxysm of fever, in contrast to our inability to find the spirochæte by that examination during the quiescent period.

There is a rapidly growing bibliography covering this comparatively rare disease, which is summarized by Dr. Cameron Stewart, of Montreal, in the present issue of this *Journal*.

WOAD.—The only association of this word in the minds of most people is with the ancient Britons, as described by Cæsar in his Commentaries, where he tells us that they painted themselves blue with woad in order to appear more horrible in fight. Those, however, who have read *The Woad Plant and its Dye*,\* by the late Dr. Jamieson B. Hurry, must realize that the product of the woad plant, or *Isatis tinctoria*, was for hundreds of years of the greatest commercial importance. The dye prepared from it was almost the only blue used for colouring cloth, until it was displaced by the oriental indigo. Whole districts of France and Germany were enriched by its culture, and in Italy and England the plant was widely grown until the beginning of the nineteenth century. How the Britons and Piets came to know that this yellow-flowered member of the great order of Cruciferae could be made to provide a blue pigment is a mystery. Probably they did not prepare woad themselves, but obtained the pigment ready for use from the Continent. It was only by a process of fermentation of the powdered leaves that the blue dye was obtained.

\* *The Woad Plant and its Dye*. By the late Jamieson B. Hurry, M.D., London: Milford, Oxford University Press, 1930. (21s. net).

Doctor Hurry was the originator of the term "vicious circle", about which he wrote very convincingly. [ED.]

"Anything green that grew out of the mould  
Was an excellent herb to our fathers of old,"

and woad was no exception to this rule. It is to be found, judging from the wealth of quotations given by Dr. Hurry, in almost every herbal or pharmacopœia until the eighteenth century, when James, in his medical dictionary published in 1745, wrote:

"Woad is restraining [that is, astringent] and drying and sometimes us'd to stop both inward and outward bleedings. It is, also, applied with good success, for Ruptures and Strains and to strengthen the Joints. It is an ingredient in the Emplastrum ad Herniam. It is esteemed an excellent vulnerary."

Nowadays, whether as a medicament or a dye-stuff, woad is obsolete, but Dr. Hurry, with great erudition and almost incredible industry, has rescued it from mere oblivion in this book, into which we think he has put all that is known or can now be known of the history of the plant, the methods of preparing the dye, the laws which in sundry lands regulated its sale and use, and the taxes and customs which were levied upon it. We deeply regret that the author's death, at the beginning of last year, sets *finis* to the list of his works on medical subjects, and on the history and archæology of Reading, which he loved so well.—*Brit. M. J.*, 1931, 2: 253.

## Editorial

### PERIODIC PAYMENT PLANS FOR THE PURCHASE OF HOSPITAL CARE (GROUP HOSPITALIZATION)

**S**TIMULATED by the increasing difficulty experienced by patients of moderate means in meeting the costs of hospital illness, public hospitals on this continent, particularly in the United States, have been studying various plans for meeting the economic problems of their patients, and at the same time providing themselves with sufficient income to permit them to remain open. Beginning in Texas a few years ago, plans for this type have gained a remarkable impetus, and already several hundred somewhat similar plans have been either proposed or put into operation. Companies are springing up everywhere with proposals to hospitals and to prospective patients, not all of which proposals are actuarially sound, and, as a result, medical and hospital associations have been giving the subject considerable thought during the past few months with the idea of assisting the hospitals and the public by emphasizing and formulating those essentials which are required to protect the public, the doctors and the hospitals.

In brief, the majority of these proposals undertake to insure *groups* of employed persons, hence the term *group hospitalization*. The annual fee, usually eight to ten dollars, covers hospitalization only, the medical and special nurses' fees still being a matter of arrangement with the patient. Groups of hospitals are combining in a common scheme, or hospitals are acting individually. The hospital (or hospitals) in some instances operates the plan itself and solicits members, while in others the business arrangement is in the hands of a commercial concern. Net profits, after allowance has been made for operating expense and a reserve fund, are paid to the participating hospitals, paid back to the patients by lowered assessments, or may go to the commercial organization. Dependents are seldom included. In some respects the plans resemble closely the "subscriber" or "check-off" schemes which have operated in the coal districts in Nova

Scotia and in other parts of Canada for thirty years or more.

With such a multiplicity of forms, it is only natural that their reception should be far from unanimous. The Trustees of the American Hospital Association have formally endorsed the principle involved; at the February meeting of the Council on Medical Education and Hospitals of the American Medical Association many possible objections to the idea were presented. Some local medical societies have entered into the plan most enthusiastically; others have protested the adoption of the particular scheme under proposal.

In an effort to protect all parties concerned and to eliminate those features to which objection has been taken, the Council on Community Relations and Administrative Practice of the American Hospital Association has prepared a series of recommendations for the guidance of hospitals considering the adoption of one of these plans. The Council is under the able chairmanship of Dr. S. S. Goldwater, of New York City, and includes a number of outstanding hospital workers representing all parts of the continent. Dr. A. K. Haywood, of Vancouver, and Dr. Harvey Agnew, of the Canadian Medical Association, are Canadian representatives. Dr. Geo. F. Stephens, of Winnipeg, President of the Association, is an *ex officio* member, and a former Montreal administrator, Dr. Basil C. MacLean, of New Orleans, is also a member.

The recommendations of the Council are available in booklet form and include the following:—

Hospital charges only should be included. Pre-existing relationships between physician and patient should be unaffected, except that the patient, having no hospital bill to pay, should find it easier to meet his doctor's account.

The subscriber should have free choice of physician.



The subscriber should be able to select any participating hospital to which his physician has access or is acceptable. To permit this the plan should include as far as possible all hospitals of standing in the community.

For a beginning, membership should be largely drawn from regularly employed groups of workers. As individual subscribers increase the cost of operation, such should be accepted only upon voluntary application and, as a rule, should pay a higher subscription. Dependents should be enrolled as additional subscribers or could get a substantial discount from regular hospital rates.

Benefits should accrue only after a certain waiting period (longer for individual subscribers), and should be limited for any one year. Three weeks is suggested. Certain diseases not ordinarily treated in general hospitals should be excluded.

"The control of the plan and the direction of activities must remain in the hands of a non-profit organization composed of or representing the hospitals, and must not be transferred to an employed enrolling agency. Hospitals should decline to enter into contracts with any business agency which controls or seeks to control the finances or management of the plan."

Reserve funds should be set aside for contingencies, and any surplus over hospital costs and operating charges should be employed for the benefit of subscribers, either in the form of a reduction in rate or of an extension of hospital services.

Hospitals should be paid a "reasonable sum" for caring for these patients. This should be approximately equal to the actual current maintenance costs for the type of service provided.

Certain difficulties are certain to arise. For instance, the actual costs of such a plan cannot be accurately estimated, owing to the lack of adequate actuarial data, but with so many diverse plans now in operation, or shortly to be inaugurated, sufficient experience should soon be available to indicate whether or not the principle is sound, and, if so, which plan or plans should be favoured. Undoubtedly adoption of the quoted recommendations should prove a considerable safeguard to the subscriber, the doctor, and the hospital, and should help to offset and render unnecessary the demand of large sections of the people for more radical and potentially dangerous changes.

HARVEY AGNEW.

### TRUE BLOOD SUGAR VALUES

**A**MONG the various biochemical measurements having value in medicine that of blood glucose ranks high. However the precise significance to be attached to the figure of any result is rendered a little uncertain at present, since such figure depends upon whether venous or arterial (capillary) blood has been analysed, and what particular method of analysis has been employed. Correct appreciation of data in the literature involves recognition of this variability; it is not altogether negligible in determining the bearing of results upon diagnoses.

Blood for analysis is usually drawn either from an arm vein (venous blood) or from the finger tip (capillary blood). It has been satisfactorily shown by various investigators that capillary and arterial blood-sugar values are practically identical. On this continent

venous blood is generally, but not invariably, used for such chemical analyses; in European countries the reverse is perhaps true. The sugar present in the general circulation is supplied from that resulting from digestion and from glycogen stored in the liver and transformed to glucose as required; the tissues, particularly the muscular tissues, draw their sugar from the blood passing through their capillaries. It is therefore to be expected that venous blood, after passage through these tissues, will contain less sugar than arterial blood proceeding to them. It has actually been found that during the fasting state (*e.g.*, before breakfast) the sugar values obtained for venous and arterial blood are practically identical, but that when blood is obtained one-half to one hour after a meal the values for arterial blood are markedly greater than those for venous

blood.<sup>1</sup> This difference tends to disappear in diabetes,<sup>2</sup> in which disease the tissues, less able to dispose of glucose, distract on the blood for it to a smaller extent.

A method very commonly employed in analysing venous blood is that devised by Folin and Wu a number of years ago. In this method blood proteins are precipitated by tungstic acid, and sugar is estimated in the clear filtrate by a colorimetric procedure, using a special copper reagent. Numerous recent investigations by Folin, Benedict, Somogyi, and others, have shown that this filtrate contains certain substances, such as creatinine, ergothioneine, and glutathione, which are capable of reacting with this copper reagent. Hence the method yields results which are too high; the error above the true glucose value, estimated in terms of glucose, is for normal persons some 20 to 30 mg. per 100 c.c. of blood. In diseased conditions associated with nitrogen retention the error may be greater.<sup>3</sup> In contrast with the original Folin-Wu procedure, methods in which zinc hydroxide is used as protein precipitant, such as the Hagedorn and Jensen procedure for finger-tip blood, and that devised by Somogyi<sup>3</sup> for venous blood, yield results which are at least very nearly accurate, since the interfering reactive substances are removed along with proteins by the precipitant. Obviously, in referring to published data employing one or the other procedure, some means of differentiation is

necessary, such as, for example, employment of expressions such as "enhanced-glucose," and "true-glucose" values. The Folin-Wu figures for normal blood sugar are usually stated to vary from 80 to 120 mg. per 100 c.c. during the fasting condition,<sup>4</sup> and from 120 to 160 mg. per 100 c.c. one-half to one hour after a meal, all determinations being on venous blood. The corresponding true values are, for fasting blood, 70 to 95 mg.,<sup>5</sup> and, at the similar period after a meal, 110 to 140 mg.<sup>6</sup> When arterial blood is used, the enhanced and even the true values determined shortly after a meal may slightly exceed 200 mg. per 100 c.c., a figure which, when we think, as we generally do, in terms of venous blood, we regard as pathologically high.

All sugar tolerance curves should be interpreted in light of these considerations. In such curves not only is the maximum value higher but the rate of fall to fasting level is slower with arterial than with venous blood.

In marked cases of diabetes the figures obtained, whatever the method, are so high that no significant error can arise from their interpretation. In those borderline cases in which it is desirable to rule out or confirm a diagnosis of diabetes it is necessary to know and apply the precise meaning of the figures obtained for blood glucose.

A. T. CAMERON.

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## Editorial Comments

### Undulant Fever and Missed Diagnoses

There is evidence for thinking that undulant fever and infections in that class are becoming more prevalent in most countries. Cases, however, are often so mild and so erratic in their manifestations that the diagnosis may be missed. The chief reason for this is that the physician does not always remember that there is such a thing as undulant fever, or, if he does, the disease is looked upon as something rare and exotic. Whenever one meets with a fever of uncertain origin, particularly if it is prolonged, undulant fever should be thought of as a possi-

bility, and resort should be had to the agglutination test in order to test the matter. To some extent the situation is relieved by the fact that most public health laboratories in this country do *Br. abortus* agglutination tests as a routine at the same time that they do the Widal's.

Short of having a positive agglutination test the difficulties in the way of making a diagnosis in suspected cases of undulant fever are quite considerable. Unless the temperature of the patient is charted every four hours, a slight elevation which is intermittent may be missed altogether. A prolonged fever, if the "un-

dulant" feature is not present, or is missed, will naturally suggest typhoid, particularly if the spleen is enlarged, or if there is epistaxis and melæna. A petechial eruption may suggest some form of purpura, or even typhus fever. Pains in the bones and joints will suggest influenza or rheumatic fever. In the last issue of this *Journal* Dr. H. R. Clouston, of Huntingdon, reported a case of undulant fever which was short in duration and of a clinical character to suggest influenza, but was diagnosed by means of the agglutination test. There are a few points, however, which should, more than others, suggest the possibility of undulant fever. The disease is most likely to be found in males, and particularly in those having to do with cattle. The use of milk from an infected herd strengthens the evidence. The striking clinical feature in undulant fever is a continuing fever, having no obvious cause, in a patient who suffers apparently no serious discomfort, as he eats well and often goes about his work as usual. Drenching sweats at night are a suspicious sign. There may be a peculiar and characteristic odour about the body. Experienced cattle men, it is said, are able to detect the presence of the disease known as contagious abortion in cattle by the smell in the stables. The blood picture is suggestive—there is a slight leucopenia, with a relative increase in the lymphocytes.

A word or two more should be said about the agglutination test in *Br. abortus* infections. A positive result in dilutions of 1:100 to 1:10,000 is indicative of infection with this organism. It should be noted, however, that the organisms may invade the body without causing clinical symptoms. A "carrier" state may be induced. Prof. G. S. Wilson (*Brit. M. J.*, 1933, 1: 414) states that he had examined the blood of ninety-eight veterinarians at a congress held at Folkestone and found that 20 per cent of them harboured agglutinins for *Br. abortus*. In arriving at a diagnosis clinical and serological evidence must be taken together. A.G.N.

#### The Canadian Formulary and Reference Companion

The new Canadian Formulary and Reference Companion has just been received, and is a convenient booklet, of a size to fit the pocket and of pleasing appearance. It is designed to supplement the British Pharmacopœia. During the negotiations that led up to the compilation of the Pharmacopœia of 1932 the General Medical Council of Great Britain accepted the prin-

ciple that this Pharmacopœia "should include only the more important drugs which are in general use throughout the Empire," and added that "where it is desired that official recognition should be given in any part of the Empire to local drugs or local substitutes, we suggest that this should be left to the Governments concerned, which by means of Supplements or Addenda, to which they may accord the necessary sanction, can meet any local requirements or introduce any modifications or alternatives desired."

It soon became evident from many considerations that it would be desirable for Canada to take advantage of this ruling and the Canadian Formulary is the result. The work is divided into three sections. The first contains a selection of formulæ intended to meet many of the needs of the practising physician or which would form a basal pharmacopœia for a hospital. The formulæ are intended for extemporaneous dispensing, and are written in the form of prescriptions, comprising a single dose, and are given a Latin designation. The second part is the Addendum, which is designed to serve as an Addendum to the British Pharmacopœia of 1932, and is official in Canada. The third part is simply intended as a source of information for physicians and pharmacists. It is in no sense official. It contains such things as A.B.C. Liniment, Arsenical Antidote, Basham's Mixture, B.I.P.P., Boulton's Solution, Carron Oil, Chlorine Gargle, Churchill's Iodine, Dobell's Solution, Easton's Syrup, Elixir of Iron, Quinine and Strychnine, Gibert's Syrup, James' Powder, Lead and Opium Solution, Plummer's Pill, Pommade Antiseptique de Reclus, Seiler's Solution, Stainless Iodine Ointment, Vleminecx's Solution, and White Mixture. This list, which is not complete, will give some idea of the scope of this section. The subjects are arranged alphabetically and there is also a good index. A table showing the dosages of various drugs used in veterinary practice is appended.

The practising physician will find this little work most helpful, indeed indispensable. It should, of course, be used in conjunction with the new British Pharmacopœia. A.G.N.

#### Erratum

In the article on Bone Tumours by Dr. B. L. Coley in our last issue the statement on page 525 "Pathological fracture is not infrequent—2.57 per cent of a series of 27 cases" should read "25.7 per cent of a series of 27 cases."



## Special Articles

### THE STUDENT LOOKS AT MEDICAL EDUCATION\*

By A. C. CORCORAN, B.A.,

Montreal

It might appear that the problems of medical education are readily stated and solved. A more or less automatic distribution of the student's energies enhances this conclusion as far as he is concerned. His criticism is apt to be hasty, directed on details, rather than impersonal, objective, and general in its application. He may fail to see the forest for trees, where others have failed to see the trees of the forest. It remains, nevertheless, that the considered opinions of the student should never be neglected and should be diligently sought. I have attempted to assemble in what follows a symposium of national medical student opinion, gathered in discussions with my classmates, with students of other years, and by communication with senior students in the other Canadian universities.

Medicine must now always be considered the application of the scientific method to the problems of health and disease. Formerly the investigator and the physician were one, and the increasing complexity of knowledge has separated their fields, without breaking the essential unity of their method and motive. The purpose of medical education, therefore, must be to produce a cultured gentleman, versed in scientific method, and having such added knowledge as will aid him in the application of this method to his particular problem. Pre-medical and post-graduate training share importance with the medical curriculum in the accomplishment of this end.

To begin as near the beginning as possible, we students realize that our secondary education was not good enough. In particular, the student's English was often neglected for mere quantitative instruction in a wider variety of subjects. It is more unfortunate that this false ideal has, though in less degree, permeated the university. The situation in the French universities is slightly different, for the French baccalaureate usually implies not only a certain capacity to retain facts but also to express ideas clearly. Too often the English-speaking student is hampered by a lack of the power of expression which more careful teaching skill and pressure might have given him. The solution here lies probably in a better under-

standing of educational ideals—unfortunately beyond unhampered university control.

The controversy in the matter of preliminary medical studies is not the wrangle of humanities versus sciences, for it is generally recognized that a little Latin and a little more Greek are very practical aids, without being absolute cultural necessities. Discussion is rather concerned with the preliminary sciences, chemistry, physics and biology, to which the term "pre-medical" has been unhappily applied. These sciences have their importance in medical education in two ways, directly as they are necessary to the physician, and indirectly as practical lessons in scientific method. To limit their consideration to that precise amount and kind which is necessary neglects their indirect and more important aim. As a body, we favour the teaching of these sciences as integral subjects, not limiting them to what is absolutely necessary for the physician, but extending them beyond this limit to what is needed for orderly scientific presentation. The details must be worked out by the heads of the departments concerned, advised by the professors of the medical faculty. It follows from what has been said that a rigid insistence on the details of preliminary education fails to recognize and often defeats its purpose. Granted that a certain amount of factual knowledge is absolutely necessary, it remains that any large excess will be rapidly forgotten, unless it happens to agree with the student's individual interest. As long as he acquires the minimum of necessary facts, he might well be encouraged in following his aptitude in the acquisition of orderly thought. We believe that it would aid the prospective student in choosing his school, and the school in selecting its students, if the minimal pre-medical requirements were standardized between the universities, always recognizing the freedom of the dean to interpret their application in any individual case. Many students are of the opinion that the admission of medical students should be even more strictly limited to men of apparent ability than it is to-day.

The place of the curriculum in medical education has been variously thought of at different times. We believe that its present purpose is to provide the student with a basis of medical method and knowledge which he may apply in any medical field after a shorter or longer period of post-graduate training. The deficiencies of post-graduate instruction necessitate the inclusion in the curriculum of much factual material which might otherwise be

\* Preceding articles on medical education can be found in the *Journal*, 1933, 28: 78, 317, 429 and 548.

profitably left to a later date. The fact that the majority of students are going into general practice will further modify the teaching. But their purpose should not be obscured by the modifications to which the curriculum is subjected.

The curriculum supposes that the student's previous education has given him the habit of thinking correctly, and it proceeds from this point to give him the habit of thinking medically; it will fail entirely if it requires him not to think at all. It should be realized that the student who chooses, or is forced by press of time to acquire, his detailed knowledge of a subject by brute force of memory is not thinking. The knowledge thus acquired is of little more than direct examination value while it is retained, and it is not retained long. If the medical school cannot deliver to the student all the knowledge, skill and technique which it would profit him to master, it should not sacrifice its function, together with much of the knowledge it can give, in an attempt to perform the impossible.

The increasing complexity and rapid growth of modern medical knowledge have directed attention to the importance of the pre-clinical basal sciences, and have lessened the importance of obscure clinical detail which a disappearing empiricism demanded. Nevertheless, it has been urged that some clinical teaching be given during the pre-clinical years and that the teaching of the pre-clinical sciences be either limited to or constantly correlated with practical clinical problems. Clinical instruction during his early years would doubtless appeal to the student's imagination, but his rapid realization of his inadequate knowledge would quickly destroy his interest in and probably his attendance at the clinic. Limitation of the basal sciences to their practical application supposes that these sciences are static and final, while it fails to demonstrate any scientific method. It is possible that carefully directed attempts at correlation may do no harm. Often, however, such instruction is at best forgotten and, at worst, misleading. Both the medical student and his clinical teachers should realize that he is a medical student and that nothing medical is foreign to him.

There remain certain practical considerations with regard to the basal medical sciences. The anatomy student left to the cadaver, the dissector, and the dread of examinations will find his study discouraging, and his insecure grasp of the subject will be demonstrated during the next few years. There is no other subject in which the didactic lecture may so readily succeed or fail. Here the lecture which is a mere recital of structure will neither interest nor instruct. The lecture which interprets

structure by embryology, histology, comparative anatomy and function will succeed, and anatomy thus taught will be remembered as a moving and living science. The other laboratory courses are intended to employ and impart the experimental method and sometimes do neither. Under certain conditions the student may be depressed rather than stimulated. The successful course would, possibly, require fewer experiments, performed individually or in groups of two or three, and less carefully controlled. Once the elements of laboratory technique have been mastered in a few controlled experiments, the student might be given some problem to follow in his succeeding laboratory periods. The elective accessibility of such a course should at least be granted.

Lack of continuity between the pre-clinical and the clinical years will vary with the particular school. If the teaching during the earlier years is so conducted that the teachers and students of the pre-clinical subjects come into frequent contact with the clinical teachers and students, a definite continuity is established. If the pre-clinical teachers will realize the purpose of their work in the general scheme, continuity can be increased without impairing the integral status of the basal sciences. The logical approach to the clinic is through the pathological laboratory and lecture theatre. It is here that the transition is really made. A student who is suddenly precipitated into the presence of disease without more than the vaguest notions of the lesion may repeat the words and imitate the motions of his instructor, but he wastes both their efforts. A preliminary introduction to the principles of general pathology would aid him in the wards, and would not prejudice his interest in his later detailed work in that subject.

The student in his clinical years is expected to learn the individual application of the methods and knowledge he has gained. Practical necessities of time and convenience require that a certain amount of very definite factual knowledge be given him during this time. Such instruction is usually with regard to emergencies of various kinds and to situations which he is apt to meet in practice which he will not meet during the average post-graduate training. The curriculum might be scrutinized for instruction of this type with a view to limiting it to minimal limits. The student's time is divided between ward and theatre clinics, clinical didactic lectures and accompanying instruction in subjects of more remote but none the less important clinical application. The function of the ward work and ward clinic is to employ the individual and inductive method; of the theatre clinic, similarly, to illustrate the separation of the clinical entities; while the didactic lecture more or less



reverses the process, by correlating and generalizing symptoms, signs and treatment from the accumulated knowledge of the disease and disease-group. Their functions overlap in some degree, while none of them will detract from the function of the text-book, which presents the subject matter largely with a view to convenience in diagnosis and treatment. As both lectures and texts may be more rapidly reviewed than the slower system of wards and clinics will permit, the student may learn the distinctions before he has learnt to distinguish. Induction, however, is the preliminary method of diagnostic and, to a less extent, of therapeutic approach; it best illustrates scientific method and is the method of good medical practice. It is clear, then, that he who fits the disease to the patient has discarded fundamental medical method. It follows that the teaching throughout, and especially in the earlier clinical years, should be directed towards symptomatology rather than diagnosis. Possibly the reason why a student often fails to remember even the simpler clinical entities of everyday importance is because he has never been permitted to discover them for himself. Certainly the importance of ward work, both for individuals and for small groups, *under an instructor who is more concerned with the observation and direction of the student's approach to a case than with his hasty diagnosis*, cannot be overestimated, but the qualification often is neglected.

The student in the wards sometimes regards the patient as a more or less depersonalized disease, whose vitality is useful chiefly for the purpose of taking the history and of illustrating the course of pathological processes not yet stilled in a preservative nor frozen on a printed page. Possibly some part of this error may be due to the student's previous training. If this is the case the defect should be traced and its source destroyed for future student generations. In some cases, at least, it is the result of a similar attitude on the part of his clinical teachers, who fail to recognize the patient in the presence of demonstrable disease. Teaching enthusiasm is very commendable; it is often sadly lacking; but no good teaching requires the assumption of an attitude which the grimest mechanist would recognize as a departure from orderly method. Diagnosis is the major part of modern treatment, but treatment is the aim of all medicine.

Next to the ward the theatre clinic is the most important source of clinical teaching in the major subjects. Its important function must be preserved, but, practically, it may take over the functions of the didactic lecture without losing its interest.

The didactic lecture occupies a somewhat precarious position in clinical teaching, for its

function is not only readily assumed by the theatre clinic, but it loses its whole aim and interest when it merely repeats readily available text-book information. It is necessarily the teaching mechanism in the minor subjects where both texts and clinics fail adequately and synoptically to survey the material; it may also be retained for instruction in the factual necessities. If it can fulfil its purpose by giving generalizations and interrelations which the text-book fails to convey, by including new and important changes which the texts have failed to secure, by conveying the spirit of medicine in the personality of the lecturer, it must be kept in general service. Otherwise conducted, it is a waste of time and should be dropped.

Whatever justification may exist for the isolation of each of the several specialties from the general field, they must not be completely isolated in their presentation to the student. The farther the specialist's diagnosis and treatment are beyond the reach of the general man, so far are they beyond the student's careful attention. The specialist is prone to teach his subject as he wishes it had been taught him, that is, as a specialty. On the other hand, he may realize the hopelessness of such an endeavour and teach carelessly. Neither attitude reacts to the student's advantage, for he may be forced to a useless cramming, even to open or hidden dislike of the specialty and the specialist. The suggestion has been made that it would be more advantageous if the teaching of the specialties were left to the general man, or at least taught as part of the general field, leaving the specialist to instruct those entering his field as he and they would desire to be taught.

While the general problem of the Faculty no longer is to decide what to put into the curriculum, but rather what should be excluded in order to provide time for thinking and reading, it may be said that at least two subjects require more detailed attention than they at present receive, namely, Infectious Diseases and Obstetrics. Both subjects illustrate as well as any the medical method; both are more or less neglected in the average internship and both are highly requisite for the general practitioner. They fulfil completely the criteria we have indicated for inclusion in the curriculum, yet few students graduate with an adequate knowledge of either. With regard to the former, a student has remarked that he had the knowledge and ability to recognize Niemann-Pick disease, without having sufficient experience to differentiate measles and scarlet fever. The fault in this case is not entirely the student's, for he is rarely permitted to follow such a case through its course; and he may not even see any typical cases. In Ob-



stetrics the problem is very similar, except that here the need for practical experience is more apparent and important. It is not necessary to emphasize the fact that obstetricians cannot be trained in the half-dozen deliveries necessitated by large classes and a full curriculum. Obstetrics may also be mentioned as one of the few subjects in which the largest part of the teaching must necessarily be factual and direct, and must so be required from the examined student.

One or two features of clinical teaching remain to be discussed. We see no reason for the presentation to the student by his lecturers of incompatible or contradictory views in a more or less disorderly manner. Such a presentation is neither scientific nor stimulating; rather, it wastes the student's time and denies him the liberty it pretends to confer. It is true that clinical teaching is necessarily characterized by a variety of opinions and theories with which the student should be acquainted. We believe, however, that it is possible and advantageous to present the subject matter of clinical teaching clearly and concisely, stating the various differences of opinion, but always selecting, where selection is necessary, some one as the current view of the department. It may be said that this is "spoon-feeding", and that individualism is being interfered with. We suggest that the student who studies for the examiner rather than the examination, learning four theories to please four idiosyncrasies is a fourfold slave. He is neither individual nor free. Similarly, the student who is forced to dig hastily for the truth about any minor problem is not following any commendable method. In other words, systematic and orderly teaching would aid the student by saving him time, and the time thus saved could be spent in true individual thinking and reading. We believe that the medical student is sufficiently mature not to waste the time thus given him, and, if, exceptionally, he is not, nothing is gained by paralyzing the initiative of the majority.

Latitude in the selection and arrangement of courses is rather an innovation in this country. The matter remains more or less experimental, and no fair decision can be reached. It might be pointed out, however, that the Faculty naturally finds it impossible to give any actual latitude in the courses which are of importance to the average student, and that the student has some difficulty in finding time for courses of less importance. The provision of elective courses in subjects of special interest is certain-

ly very desirable, but more important is the provision of time for these courses and for thinking over the work of the courses required. Another point is the fact that the arrangement of the course has a great deal to do with its success. No course which is sufficiently important to be included in the curriculum can be given successfully in small divided doses over a long period of time. Teaching must be intensive to obtain and retain interest, and it is unfair to the course, the teachers, and the students to dilute that interest with time.

It is unfortunate that examinations cannot be abolished, for their abolition would provide the only solution to the problems they offer in medical education. The various views which have been suggested in this regard make it impossible to present here any formulated opinion. Probably the best that can be done is merely to make them as fair as possible. The oral examination has probably greater possibilities than the written, but sometimes it is neither fair nor significant. It is possibly at its best when the student is passed before a series of examiners, all limiting their questions to what the student can be expected to know, all able to put the student at ease, capable of phrasing questions which the student can understand, and ready to allow him time for his reply. The recognition of the fact that examining ability is as definite a capacity as teaching ability, with a resultant judicious selection of examiners, would advance considerably the significance of examinations. Some measure of injustice remains under any system, but this may be lessened by an individual consideration of the less fortunate student, with a view to assist him, if possible, and never to reduce the estimate which his examiners have formed. The application of a rigid, unsparing rule cannot achieve even statistical justice.

The limitations of knowledge, ability and space have excluded from their present consideration many problems on which the medical student's views might bear. We hope, however, that we have not included in their place subjects of less immediate importance. We have tried to discuss medical education on the basis of our ideas of its purpose, selecting those apparently important topics on which a definite expression of student opinion could be made. We believe that the views we have presented represent a considerable portion of national medical student opinion.

I take this opportunity of thanking all those who have helped me in the preparation of this contribution.

## Men and Books

### GASPAR ASELLIUS

#### THE DISCOVERER OF THE LACTEALS

BY H. B. ANDERSON, M.D.,

Toronto

Born at Cremona in 1581, Gaspar Asellius was one of the lesser lights of the group of famous anatomists of the 16th century, Vesalius (1514-64) and his contemporaries, Fallopius and Eustachius. He became professor of anatomy in Pavia and was a surgeon practising in Milan, eighteen miles northward. His discovery of the lacteals has earned him an abiding place in the history of medicine, and may best be described in Foster's translation of his own words:—

"On the 23rd of July of that year (1622), I had taken a dog in good condition and well fed, for a vivisection, at the request of some of my friends, who very much wished to see the recurrent nerves. When I had finished this demonstration of the nerves, it seemed good to watch the movements of the diaphragm in the same dog, at the same operation. While I was attempting this and for that purpose had opened the abdomen and was pulling down with my hand the intestines and stomach gathered together into a mass, I suddenly beheld a great number of cords as it were, exceedingly thin and beautifully white, scattered over the whole of the mesentery and the intestine, and starting from almost innumerable beginnings. At first I did not delay, thinking them to be nerves. But presently I saw that I was mistaken in this, since I noticed that the nerves belonging to the intestine were distinct from these cords, and wholly unlike them, and, besides, were distributed quite separately from them. Wherefore, struck by the novelty of the thing, I stood for some time silent while there came into my mind the various disputes, rich in personal quarrels no less than in words, taking place among anatomists concerning the mesaraic veins and their function. And by chance it happened that a few days before I had looked into a little book by Johannes Costaeus written about this very matter. When I gathered my wits together for the sake of the experiment, having laid hold of a very sharp scalpel, I pricked one of those cords and indeed one of the largest of them. I had hardly touched it, when I saw a white liquid like milk or cream forthwith gush out. Seeing this, I could hardly restrain my delight, and turning to those who were standing by, to Alexander Tadinus, and more particularly to Senator Septalius, who was both a member of the great College of the Order of Physicians and, while I am writing this, the Medical Officer of Health, 'Eureka,' I exclaimed, with Archimedes, and at the same time invited them to the interesting spectacle of such an unusual phenomenon. And they indeed were very much struck with the novelty of the thing."

He repeated his experiment a few days later but to his disappointment the demonstration failed. He then passed wakeful nights thinking

over all the circumstances attending his first experiment and any departure from them that might explain the failure. On repeating, it then occurred to him that the first experiment had been carried out shortly after the dog had been fed, whereas the second was done a longer time after feeding. He again vivisected a dog soon after it had been fed and was then able to confirm the observations of his first experiment, as the lacteals were filled with chyle and therefore visible.

His discovery was published at Milan in 1627, the year after his death, and the publication is notable for being the first work in anatomy in which coloured woodcuts were used for illustration; it also contained an engraving of Asellius by Bassanus (reproduced here).



FIG. 1

A second edition was published at Venice a year later, and a third edition, the one which I am presenting to-night,\* was published at Leyden in 1640, with the following title page:

\*This paper was read before the Academy of Medicine, Toronto, on January 5, 1932.

DE LACTIBUS,  
Sive  
LACTEIS VENIS,  
QUARTO VASORUM  
mesaraicorum genere,  
Novo invento.  
GASPARIS ASELLI  
Cremonensis, Anatomici Tincinensis.  
DISSERTATIO.  
Qua sententiae Anatomicae multae, vel perperam  
receptae convelluntur, velparum perceptae  
illustrantur.  
LUGDUNI BATAVORUM,  
Ex Officina JOHANNIS MAIRE,  
cIc le cxl.

This is a small octavo volume of 104 pages and index, and contains the three illustrations of the first edition, but reduced in size and uncoloured; no portrait.

Asellius fell into the error of the pre-Vesalian anatomists in believing that the veins and

This error of Asellius was corrected later by the discovery of the thoracic duct and receptaculum chyli by Jean Pecquet in 1651, and of the connection of the intestinal lymphatics with the thoracic duct, demonstrated by Olaf Rudbeck of Upsala in 1653. Rudbeck's priority in the discovery that the lacteals drained into the receptaculum chyli, however, was disputed by Thomas Bartholin, Professor of Anatomy in Copenhagen, who published his work in 1652, and also by Jolyff, an Englishman. The claim of the latter however was based upon a drawing only, as he never published an account of his observations. It is interesting to note that Harvey never accepted the truth of Asellius' observations.

The pancreatic duct was discovered by Wirsung in Padua in 1642; the duodenal glands by Brunner in 1662; and the lymphatic follicles of the small intestine by Johann Conrad Peyer in 1677.

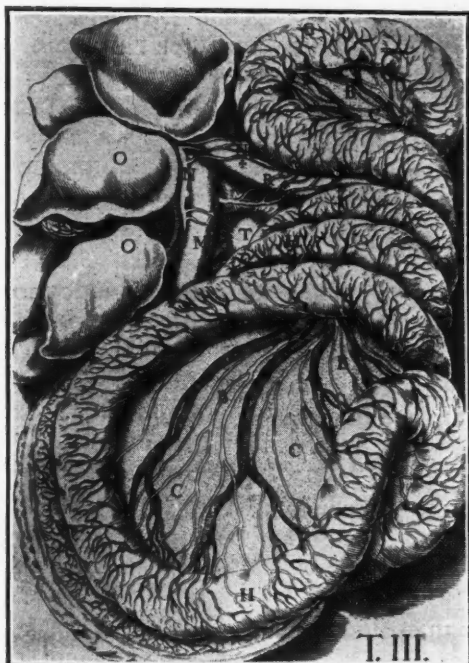


FIG. 2.—Tabulae Tertiae Explicatio.

A. Venae et arteriae mesaraicae. B. Lactae venae. C. Mesenterium. G. Intestinum jejunum. H. Ileum intestinum. M. Vena cava. N+. Lactea ad venam portae propagata, eamque coronans. O. Hepatis fibra. P. Vesica fellis. R. Vena portae. S. Colon intestinum. T. Origo mesenterii.

lymphatics of the intestines carried chyle to the liver, a belief which had come down from Herophilus and Erasistratus of the Alexandrian School, 300 B.C. His beautiful drawings show the multilobar liver of the dog and the veins, arteries, nerves and lacteals of the intestines and mesentery. The lacteals are traced incorrectly to a group of glands below the pancreas, since called the pancreas Asellii, and thence to the portal fissure of the liver (Fig. 2).

## Association Notes

### AMENDMENT TO BY-LAWS—NOTICE OF MOTION

On the recommendation of the Honorary Treasurer, the Executive Committee offers the following amendment to our by-laws, such amendment to be placed before Council for action at its next meeting to be held in Saint John on June 19th and 20th, 1933.

WHEREAS travelling expenses incurred by officers of the Association are provided for in the By-Laws as undermentioned, namely

#### CHAPTER VI—Section 4—Chairman of Council

He shall be reimbursed for his legitimate travelling expenses incurred in attending the annual meeting.

#### CHAPTER VI—Section 5—Treasurer

He shall be reimbursed for his legitimate travelling expenses incurred in attending the annual meeting.

#### CHAPTER VI—Section 6—General Secretary

All his legitimate travelling expenses shall be paid for him out of the funds of the Association.

#### CHAPTER VIII—Section 1—Editor

He shall be reimbursed for his legitimate travelling expenses incurred in attending annual meetings.

#### AND WHEREAS

Travelling expenses for members of the Executive Committee incurred in attending meetings of the Executive Committee (other than the first meeting of the Committee) are paid out of the funds of the Association,

BE IT RESOLVED THAT the following paragraph be added to Chapter VIII—Section 1, Executive Committee, as follows:

Each member of the Executive Committee shall be reimbursed for his legitimate travelling expenses incurred in attending meetings of the Executive Committee other than the first meeting of the Executive Committee, which meeting is held before the close of the annual meeting.



**FINAL PROGRAM FOR THE SIXTY-FOURTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION; AND THE FIFTY-THIRD ANNUAL MEETING OF THE NEW BRUNSWICK MEDICAL ASSOCIATION TO BE HELD IN SAINT JOHN, N.B., ON JUNE 19, 20, 21, 22, 23, 1933.**

**Headquarters—The Admiral Beatty Hotel.**

Registration will commence at 8.30 o'clock on the morning of Monday, June 19th, in the Admiral Beatty Hotel, and will continue throughout the week.

The first two days, Monday and Tuesday, June 19th and 20th, will be devoted to the business sessions of the Association, while Wednesday, Thursday and Friday will be scientific days.

**Monday, June 19th**

- 8.15 a.m.—Meeting of the Executive Committee, Canadian Medical Association—Admiral Beatty Hotel—Salon D.
- 10.00 a.m.—Meeting of Council—Salons B and C.
- 1.00 p.m.—Luncheon to Council—guests of the President-Elect, Dr. G. A. B. Addy—Georgia Ball Room, Admiral Beatty Hotel.
- Valedictory address, the retiring President, Dr. A. Primrose.
- Installation of the new President.
- 2.30 p.m.—Meeting of Council—Salons B and C.
- 6.00 p.m.—Meeting of Nominating Committee—Salon D.
- 8.00 p.m.—Dinner to Council—Guests of the Saint John Medical Society (Ball Room). Guest-speakers—The Hon. J. B. M. Baxter; The Hon. Murray MacLaren, Minister of Pensions and National Health; The Hon. Dr. H. I. Taylor, Minister of Health, New Brunswick.

**Tuesday, June 20th**

- 9.15 a.m.—Meeting of Council—Salons B and C.
- 12.00 a.m.—Luncheon on the harbour—guests of the Harbour Commission.
- 2.15 p.m.—Official opening of Commercial Exhibits—Admiral Beatty Hotel.
- 2.30 p.m.—Business session of the New Brunswick Medical Association—Lecture room of the High School.
- Meeting of Council—Salons B and C.
- 5.00 p.m.—Business Meeting, Canadian Protective Association—in Salons B and C.
- 8.00 p.m.—Dinner to Council in the Ball Room—guests of the New Brunswick Medical Association. The program will be in charge of the New Brunswick Medical Association Executive. Guest-speakers—Dr. H. F. Munro, Superintendent of Education for Nova Scotia; E. J. Henneberry, B.C.L., Saint John.

**Wednesday, June 21st**

- 8.30 a.m.—Registration—Admiral Beatty Hotel.
- 9.15 a.m.—General session in the Assembly Hall of the High School—Addresses of welcome—Hon. H. H. McLean, Lieutenant-Governor of New Brunswick; The Hon. C. D. Richards, Prime Minister of New Brunswick; J. W. Brittain, Mayor of Saint John.
- 9.45 a.m.—Nasal sinus infections from the general practitioner's point of view—Dr. L. DeV. Chipman, Saint John.
- 10.15 a.m.—Tumours of the neck—Dr. Wm. Boyd, Winnipeg.
- 10.45 a.m.—The rôle of allergy in disease—Dr. H. K. Detweiler, Toronto.
- 11.15 a.m.—The significance of hæmaturia—Dr. F. S. Patch, Montreal.
- 11.45 a.m.—Fractures of the long bones (illustrated by lantern slides)—Dr. W. Alan Curry, Halifax.
- 12.30 p.m.—Luncheon—Admiral Beatty Hotel—Short business session of the Association—Guest-speaker, Judge J. L. Carleton, Woodstock, N.B.
- 2.15 p.m.—Presidential Address—Dr. G. A. B. Addy, Saint John, Assembly Hall, High School.
- 2.45 p.m.—The evolution of cancer from benign lesions of the breast, cystic and papillomatous—Dr. E. M. Eberts, Montreal.
- 3.15 p.m.—British pioneers in the modern treatment of tuberculosis—Sir Humphry Rolleston, Surrey, England.
- 3.45 p.m.—Post-vaccinal disease of the nervous system—Dr. R. R. McGregor, Kingston.
- 4.30 p.m.—Reception at the New Brunswick Historical Museum—Dr. and Mrs. Addy.
- 7.00 p.m.—Annual Banquet of the Federation of Canadian Medical Women—Admiral Beatty Hotel.

**Wednesday, June 21st.—Continued**

8.30 p.m.—Lister Oration in the auditorium of the Saint John High School (open to the public)—Dr. Robert Muir, Glasgow.

This will be followed by an informal dance in the ball room of the Admiral Beatty Hotel.

**Thursday, June 22nd**

9.30 a.m.—Organized medicine and the public health—Dr. A. Grant Fleming, Montreal.

10.00 a.m.—Recent advances in anæsthesia—Dr. Harold R. Griffith, Montreal.

10.30 a.m.—Tuberculous rheumatism does exist—Dr. Albert LeSage, Montreal.

11.00 a.m.—The cancer problem—Dr. F. N. G. Starr, Toronto.

11.30 a.m.—Heart block (lantern slides)—Dr. K. A. MacKenzie, Halifax.

12.00 a.m.—A chalk talk on the anatomy of hernia—Dr. A. Primrose, Toronto.

12.30 p.m.—Luncheon at the Admiral Beatty Hotel—Guest-speaker—The Hon. P. J. Veniot, former postmaster-general of Canada.

2.15 p.m.—Intestinal obstruction—Dr. W. E. Gray, Milltown, N.B.

2.45 p.m.—Blood changes noted in tuberculosis—Prof. Lyle Cummins, Cardiff, Wales.

3.15 p.m.—The specific prevention of measles, scarlet fever, and diphtheria—Dr. J. G. FitzGerald, Toronto.

4.00 p.m.—River excursion and sea-food dinner, completing the day's program.

**Friday, June 23rd**

9.30 a.m.—Renal glycosuria—Dr. I. M. Rabinowitch, Montreal.

10.00 a.m.—The treatment of pernicious vomiting of pregnancy—Dr. H. B. Atlee, Halifax.

10.30 a.m.—Pitfalls in the diagnosis of conditions giving rise to chronic abdominal discomfort—Dr. J. S. McEachern, Calgary.

11.00 a.m.—Physical medicine—Dr. W. F. Roberts, Saint John.

11.30 a.m.—The importance of a correct diet in childhood—Dr. Alan Brown, Toronto.

12.00 a.m.—Goitre—Dr. F. H. Lahey, Boston.

12.30 p.m.—A new method for the permanent cure of gastro and entero-colic ptosis (report of 45 cases, with lantern slide demonstration)—Dr. Eugene St. Jacques, Montreal.

1.00 p.m.—Luncheon—Admiral Beatty Hotel—Guest-speaker—Rev. Jas. Dunlop, Saint John.

**LADIES' PROGRAM****MONDAY, JUNE 19th**

8.00 p.m.—Informal theatre party.

**TUESDAY, JUNE 20th**

1.00 p.m.—Luncheon at the Cliff Club for the wives of members of Council and the wives of the Executive of the New Brunswick Medical Association, guests of Mrs. Addy.

7.00 p.m.—Dinner-Bridge at Riverside Country Club.

**WEDNESDAY, JUNE 21st**

4.30 p.m.—Reception by Dr. and Mrs. Addy at the New Brunswick Historical Museum.

8.30 p.m.—Lister Oration, followed by an informal dance in the ball room of the Admiral Beatty Hotel.

**THURSDAY, JUNE 22nd**

10.00 a.m.—Golf Tournament at the Riverside Country Club.

2.00 p.m.—Picnic at Woodman's Point.

**FRIDAY, JUNE 23rd**

3.00 p.m.—Sight-seeing drive and tea at the Saint John General Hospital.

**GOLF**

The privileges of the Riverside Golf and Country Club and the Westfield Country Club have been obtained for Tuesday, Wednesday, and Thursday, June 20th, 21st and 22nd.

The Riverside course is one of eighteen holes, beautifully situated, overlooking the Kennebecas River.

The Westfield Club is beautifully situated on the Saint John River.

The tournament play for the Ontario Cup and the New Brunswick Medical Society Van Wart Trophy will take place on Wednesday, June 21st. Those entering for tournament play are requested to register for golf at the general registration table; transportation to and from the golf course will be provided.

**HOTELS**

Admiral Beatty . . . . .	250 rooms, \$2.50 up
Royal . . . . .	150 rooms, 1.75 up
Clifton House . . . . .	40 rooms, 2.00 up
LaTour . . . . .	52 rooms, 1.00 up
Victoria . . . . .	40 rooms, 1.00 up

**TRANSPORTATION**

For the convenience of those attending the meeting, arrangements have been made for the purchase of railway tickets under the identification certificate plan.

1. Under this plan round-trip tickets will be sold to Saint John upon presentation of an

"Identification Certificate" for one way adult fare and one-third, plus 25 cents. The minimum round-trip fare will be \$1.25.

2. Tickets for members of the family may be purchased at the same time, with the same certificate and on the same terms.

3. Children under five years of age when accompanied by parent or guardian, free; five years of age and under twelve, one-half the regular adult fare plus 25 cents. The minimum round trip fare will be 75 cents.

4. Tickets may be used only via the same route in both directions, over lines shown in current tariffs.

5. Dates of sale—Three days (not counting Sunday) before opening date of meeting, or the first three days of the meeting (not counting Sunday), *i.e.*, date of purchase and departure from home, June 15th to June 21st.

6. Return limit—Thirty days in addition to date of sale.

If you wish to travel by the Identification Certificate Plan please advise the General Secretary of the Association, 184 College Street, Toronto, and an identification certificate will be mailed to you.

#### Famous Medical Portraits

An exhibition of unusual interest to medical men has been arranged for the meeting of the Canadian Medical Association by the Museum Galleries of London, England, which have opened Canadian offices in Toronto. Practitioners in this country will thus see for the first time a complete series of the rare mezzotinted portraits of such historic figures as Harvey, Hunter, Jenner, Linnæus, Pasteur, Lister, Huxley, Bell, Simpson and others, reproduced by official permission of the owners of the original contemporary oil portraits in the Royal College of Surgeons, the National Portrait Gallery, and other famous collections in England and elsewhere. These signed artists' proofs are produced entirely by hand by famous engravers and will help ambitious art collectors in the profession to acquire some famous pictures at a very moderate cost.

### Hospital Service Department Notes

#### Safety in Hospitals

The subject of safety in hospitals has been of increasing concern to hospital administrators and to staff members during the past few years, partly because a number of accidents of various types have focussed attention on this subject, and partly because the increasing

complexity and potential dangers of the varied mechanical and electrical equipment in hospitals has rendered greater care and supervision essential. The danger from stored x-ray films has been either removed or minimized in most hospitals, and the increasing use of fireproof construction should in time prevent the terrible holocausts of the past, but many other dangers remain. Anæsthetic explosions still occur, electrical apparatus becomes short-circuited or grounded, elevator accidents occur all too frequently, and the ideal flooring and stair tread have not yet been discovered.

In an effort to bring clearly to the attention of hospitals the various possible dangers encountered in hospitals and to suggest the best possible way of combating these dangers, the National Safety Council of Chicago, in co-operation with the American Hospital Association, has prepared a bulletin entitled "Safety in Hospitals," a copy of which should be on the library table of every hospital in the country. This bulletin, which was prepared by Stewart J. Owen, Jr., Safety Engineer of the National Safety Council, gives detailed instructions, for instance, on how to safeguard against anæsthetic explosions, how to care for electrical equipment, how to construct and protect steam boilers, elevators, etc., how to guard against incinerator fires, how to store x-ray films, and how to guard against radium burns. The holding of fire drills and the care and use of fire extinguishers are considered. A number of hospitals in Canada have had fires which arose in the laundry, sometimes from spontaneous combustion, and this possibility, as well as that of kitchen fires, is carefully considered. Copies may be obtained from the American Hospital Association, Chicago.

#### Shock from Electro-medical Apparatus

The increasing use of electro-medical apparatus and the resultant increased possibility of accidents has prompted the British Ministry of Health to publish a warning to physicians, hospital workers and others using this equipment. As published recently in *The Hospital* (London) several dangers should be kept in mind, particularly when the alternating current is used, as this seems to be more dangerous than a direct current of the same voltage.

Old apparatus with worn or improperly insulated connections and parts constitutes a grave source of danger. Also the usual metal bedstead if in contact with water pipes, radiators, or even grounded through a radio receiver, may cause a fatal shock. The increasing use of radiant heat baths, resuscitation cradles, thermal pads and similar appliances, receiving current in direct connection with the main current supply, necessitates increased precaution lest the patient be accidentally "grounded". One fatality

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.



is cited. Where several patients are undergoing treatment simultaneously they should not be within reach of each other. Where floors are of conducting material, the metal work of electrical apparatus should be grounded; if of non-conducting material, the equipment might better be insulated. The danger of portable apparatus in bath-rooms or wash-rooms is emphasized.

Projectors for light treatment and arc lamps possess the common feature of the exposure of live conductors within the reflectors. The more general adoption of mesh guards is urged and grounding of the metal work is advised. Galvanic, faradic and sinusoidal currents may be of a comparatively safe "earth free" type of construction, or may be of a type in which electrical isolation from the main supply is not affected. A breakage of the resistance winding in this latter type might result in exposing the patient to mains' pressure. This applies also to cautery burns and cavity lamps connected to sources of main supply through resistance windings. With diathermy equipment there are certain makes in which the intermediate circuit is not isolated from the patient's circuit, and under certain circumstances this involves a definite element of risk. It is suggested that a preference be evinced for designs in which:— (1) the patient's circuit is electrically isolated from the intermediate (or spark-gap) circuit; (2) the spark-gap is mounted inside the cabinet or enclosure; (3) the door of the cabinet or enclosure is so interlocked with the source of main supply as to ensure that the latter is disconnected when the door is opened.

Regular and systematic inspection by competent experts, to ensure the maintenance of efficient insulation, is urged. Moreover, all possible steps should be taken to guard against interruption of the current whilst the patient is under application. Whilst current up to considerable densities may flow without appreciable discomfort, provided efficient contacts are made, the consequences of sudden interruption, such as might be caused by a fuse blowing, a bad contact in a plug-fitting, or a breakage in a flexible connection would certainly lead to shock, under some conditions, of a severe character.

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## Provincial Association Notes

### The Saskatchewan Medical Association

A special meeting of the Saskatchewan Medical Association was held in Saskatoon on February 28th, for the purpose of considering urgent matters regarding the medical treatment of indigents of municipalities and to confer the following day with the Union of Rural Municipalities, meeting in Saskatoon at the time.

The president gave a short review of the present economic situation, and then asked that

the report of the special committee on health insurance be given by its convenor, Dr. S. E. Moore. The committee reviewed the history of health insurance in other countries, particularly in Great Britain. They mentioned the work of the American Committee of the Costs of Medical Care, and referred to the report of the Royal Commission on State Health Insurance and Maternity Benefits of the Province of British Columbia and the inquiry into systems of state medicine by the Legislature of Alberta in 1929 and the later committee which met on November 8, 1932. They summarized a report of the Committee on Social Insurance of the Provincial Government in Quebec.

The committee felt that in Saskatchewan the principle of health insurance should be followed, that the patient should have the choice of a doctor, and that the doctor should be paid for services rendered. When a patient residing in a municipality which has a municipal doctor leaves that municipality for further treatment that can be rendered by specialists the patient or the municipality must pay an extra amount in addition to the salary paid to the municipal doctor.

It is unfortunate that the choosing of a municipal doctor brings up bartering and under-bidding of one medical man against another. Certain parts of Saskatchewan have had a doctor in every town, but one section of the country that formerly had twenty-five doctors now has only one. The municipal scheme does not allow for the efficient distribution of the doctors. The municipality must pay the doctor, but if it has a crop failure it has no funds to pay; if the control were provincial when one section was unable to bear its load the other sections could carry it.

The committee reviewed the cost of sickness and accident insurance policies in various commercial companies. There are forty-five accident and sickness insurance companies operating in Saskatchewan; net premiums amount to \$289,068; net losses incurred were \$182,000.

The maintenance of hospitals and sanatoria in the province costs \$3,518,791. There are 37 full-time municipal doctors in the province, that is about 12 per cent of the 302 rural municipalities; 9 other municipalities have passed the necessary by-law, but no appointment has yet been made. There are about 29 part-time bonus physicians. The cost for a family of five for a rural municipal doctor is about \$11.50, or about \$3.80 per quarter-section. Expenditures covering all medical costs would be about \$25 or \$30 per family.

Each municipality could unite into a group for group-insurance, but if the whole province took it up the scheme could be administered through the Municipal Department and the Department of Public Health of the province.

Cardinal principles are: (1) patients should

have the right to exercise their choice of a physician; (2) the family physician should be the centre of the plan; the specialist should be secondary; (3) the physician should not be on salary, but should be paid the fees agreed upon by the medical profession and the Health Insurance Commission; (4) no "patch-work" system should be adopted, but the system should cover the whole province and give service to all those with minimum incomes including the rural population; (5) the system should provide the greatest possible incentives for the profession to do post-graduate work and thus keep up with the current of proved knowledge; (6) any plan at the present time should not embody the principle of financial compensation for time lost through illness; (7) definite and well-recognized precautions should be taken to prevent excessive costs to the community through hospitalization and medical treatment of malingerers; (8) preventive medicine, with all that it includes, should be a prominent feature of any health insurance scheme; (9) the scheme should be contributory and compulsory; (10) as members of the medical profession we are particularly interested to demand that the existing relations between doctor and patient should be maintained, that the ethics of "professional secrecy" should be respected, and that "freedom of prescribing," with agreed restrictions, should be provided for; (11) that in arbitration of any disputed point as between the contracting parties, *viz.*, qualification of practitioner, fees, duration of illness, etc., the medical profession should be represented by the Province of Saskatchewan Medical Association, either directly or through a regularly appointed committee.

The committee recommended that the Saskatchewan Provincial Medical Association approach the various social organizations of the province through a committee, with a view to the holding of a conference of all the organizations who are, or may become, interested in the provision of adequate medical care to the people of the province at as reasonable a cost as possible, for the purpose of discussing the subject.

The committee regarding indigents and rural municipal relations reported that for the present we accept from the rural municipalities, for those who are at present unable to pay, 50 per cent of the minimum schedule fee. Inability to pay shall be decided by the attending physician, an officer of the rural municipality, and if necessary, in case of dispute, a third party to be mutually agreed upon. (2) Patients should have free choice of medical attendant; we do not look with favour upon the policy of rural municipalities entering into an agreement with any one doctor or group of doctors outside the municipality for special medical or surgical services. (3) That in the event of emergency treatment the certificate of the attending physi-

cian be accepted by the rural municipality as obligating it to pay 50 per cent of the schedule fees. (4) That we recommend the drawing up by the Department of Public Health and the Council of the College of Physicians and Surgeons of Saskatchewan, and the Executive of the Saskatchewan Association of Rural Municipalities, of a standard form to be used as a basis of contract between physicians and rural municipalities entering into an agreement for a municipal doctor, including a minimum salary per township. (5) That where a municipal physician is to be engaged a local practitioner be given the preference, qualifications being equal. (6) That we strongly urge that municipalities, when advertising for a physician, state the salary proposed to be paid. (7) That representation be made in proper quarters to continue for the balance of the year the grant at present given by the Relief Commission to physicians in the relief area. (8) That the Saskatchewan Medical Association and the Saskatchewan Rural Municipalities Association join, in a request to the Saskatchewan Legislature, in an appeal by delegation if necessary to the Department of National Health, for the establishment of a fund for the assistance of municipalities in maintaining essential health services.

Delegates from the Rural Municipalities Association met with the medical men. Discussion was free and friendly. It was agreed that the indigent patient should have the choice of physician, that 50 per cent of the regular schedule of fees be paid for indigent cases, that a patient coming to the city for treatment would bring a letter signed by the secretary of the municipality taking on responsibility for payment. It was agreed that a doctor called to an emergency case be authorized to give first treatment or any other necessary treatment during the emergency. The solicitor of the Hospital Association and the solicitor for the rural municipalities drafted a clause defining "emergency" as far as the hospitals are concerned. On receipt of a certificate from the medical health officer of the municipality, or of the physician attending the patient, that it will imperil the life or health of the patient to delay admission to hospital until the authority of the council of the municipality is obtained the case shall be deemed to be an emergency case.

There was less feeling of antagonism after the meeting with the Rural Municipalities delegates than there has been at any time since the medical men have tried to collect fees for the treatment of indigents. The rural delegates have ceased to look upon doctors as wealthy capitalists exploiting the sick and the doctors realize that when a situation is carefully explained to a reasonable layman he will be fair in meeting his obligations.

LILLIAN A. CHASE



## Medical Societies

### The Academy of Medicine, Toronto

The twenty-sixth annual meeting of the Academy of Medicine, Toronto, was held in the Academy building on May 2nd, 1933. The report of the Honorary Secretary showed the total Fellowship to be 1,062, an increase of 26 over last year. The reports from the various officers and committees reviewed the numerous activities of the past year.

The library, which has shown a steady yearly growth, now contains 23,207 volumes, an increase of 772 for the past year. As the largest medical library in Ontario, and the second largest in Canada, it has proved of great value not only to the Fellows of the Academy but also the Provincial University and the medical profession at large.

The Academy was fortunate in hearing addresses from many distinguished visiting physicians and surgeons. Very interesting and varied programs presented at the stated and sectional meetings and subjects of particular interest to the profession and public alike were discussed. The Academy last year inaugurated a post-graduate course of lectures which were open to all physicians in the province and were well attended and very highly recommended.

The work of the retiring President, Dr. R. S. Pentecost, who had just completed a most successful year in office, received many favourable comments. The election of new officers and members of Council resulted as follows:—*President*, Dr. E. A. McDonald; *Vice-President*, Dr. M. H. V. Cameron; *Hon. Secretary*, Dr. Gilbert Parker; *Hon. Treasurer*, Dr. James W. Ross.

**ELECTIVE MEMBERS OF COUNCIL**—Drs. F. A. Clarkson, C. E. Cooper Cole, C. H. Hair, Oskar Klotz, Harris McPhedran, Robin Pearse, D. E. Robertson, James Simpson, R. H. Thomas, H. C. Wales.

**CHAIRMEN OF SECTIONS**:—*Medicine*—Dr. H. I. Kinsey; *Surgery*—Dr. John McCollum; *Pathology*—Dr. George Shanks; *Ophthalmology*—Dr. Colin Campbell; *Oto-Laryngology*—Dr. J. Grant Strachan; *Preventive Medicine and Hygiene*—Dr. W. J. Bell; *Pædiatrics*—Dr. S. F. Goodchild; *Obstetrics and Gynecology*—Dr. Gordon Gallie; *Anæsthesia*—Dr. H. S. Douglas; *Sub-Section of Neurology and Psychiatry*—Dr. Goldwin Howland.

### The Sixth International Congress of Military Medicine and Pharmacy\*

The International Congress of Military Medicine and Pharmacy, with its first gathering in

Brussels in 1921, was inaugurated to enable representatives from every branch of the medical services of the world to meet together and discuss the lessons of the war gained on both sides of the firing line, and to keep in touch with the remoter results and the latest therapeutic measures advised. Such a Congress is a new departure in medico-military history, and we owe its inception to Belgium. In order to make exhaustive studies of a few selected subjects at a time, a congress has since been held every two years with meetings of the Permanent Committee in the intervening year whenever necessary. As may be expected many subjects yet remain to be studied at the future biennial meetings. At each congress five main questions are taken up with official reports on each question from two countries—one, the country in which the Congress is held, and the other country chosen because of its particular experience in the subject under discussion. These official reports consist of a paper submitted by some chosen member or group from each country. In addition to the two main papers of 20 minutes each, short communications relevant to the subject are received from any members desiring to contribute. At the conclusion of the debate on the subject in hand, contributors and members participating in the discussion are formed into a Committee to report their unanimous conclusions to the Permanent Committee. This Committee in turn submits them after any further amendments considered advisable to the Congress, where they are duly approved if all the members are unanimous in their favour.

The Report under review covers in a very complete way the proceedings of the sixth of these Congresses, held at the Hague in June, 1931, and was prepared by Commander W. S. Bainbridge, M.C.F., of the U. S. Naval Reserve, one of the delegates from the United States of America for presentation to his Government.

Possibly the question that aroused the most general interest and drew forth the largest array of expert opinion was the second, entitled "The psychoneuroses of war" the immediate and remote effects of war on the nervous system of combatants and non-combatants." Among the conclusions reached were that war has not created any psychosis of a new kind, and that the symptomatology of every war psychosis was entirely comparable to that observed in the same patients in peace-time, but coloured by the events of the war of which it was a faithful reflection. Although not mentioned in the conclusions adopted by the Congress, some of the statements in the papers are noteworthy. Colonel W. F. Lorenz, of the U. S. Medical Corps Reserve, Professor of Neuro-Psychiatry, University of Wisconsin, says, "Experience has taught that the possibility of using mentally deficient adults in even a limited capacity in military organizations must be abandoned." Dr. Philip Matz, of the U. S. Veterans' Bureau, stated that the statistics of the Bureau show that 9,194 patients with neuro-

\* Report of the Sixth International Congress of Military Medicine and Pharmacy. The Hague, June, 1931. Report of Commander W. S. Bainbridge, M.C.F., U.S.N.R. for Delegation from U.S.A. 167 pages, price \$1.00. Superintendent of Documents, U.S. Government Printing Office, Washington, 1933.



psychiatric disease were under hospital care in 1923; that in 1930 the number had increased to 14,941; and that it is realized that the peak of the hospital load has not yet been reached. In another paper, contributed by psychiatrists of the Walter Reed General Hospital, U. S. Army, the opinion was expressed that the number of these cases in hospitals will increase until the maximum is reached in 1947. As the veterans grow older they are more prone to nervous and mental disease.

The first question entitled "Recruiting, training and advanced training of military medical officers and pharmacists" is left to the last, for although the papers and other documents take up more space in the report than even the papers on the psycho-neuroses of war it is felt that it may be only of interest to medical officers or medical students considering a service career. On the subject of recruiting for the services the Congress decided that there were only two solutions, viz., either to recruit students at the beginning of their studies or graduates. No closer solution was reached, although most of the papers appeared in favour of the former, which is the system followed in France. The latter as we all know is the custom in English-speaking countries. No opinion in this connection was remarked in any of the papers contributed by British or United States officers. For advanced training the Congress was against exclusive specialization along purely professional or military lines, as senior officers should always be in a position to manage all departments of their service. A unanimous wish was expressed that the various nations would favourably regard the proposal of an exchange of medical officers among the different countries.

The next Congress, the seventh, will be held in Madrid this year, and it is expected that the subsequent one will be held in the United States in 1935. It is to be hoped that Canada will be represented in this the Eighth Congress, not only by official delegates but also by many medical officers as private members, who may take this opportunity of enjoying a week of unusual professional interest, while participating in official functions and social festivities held on a scale worthy of the dignity and importance of this international event. For such prospective participants the report is a ready source of information on the activities they may anticipate, as well as an introduction to the aims and objects of the Congress.

LORNE DRUM

(This report has a melancholy interest at this time, since before it could be published word had been received of the much regretted death of the author.—ED.)

### The Leeds and Grenville Medical Society

On May 4th, at St. Vincent de Paul Hospital, Brockville, the Leeds and Grenville Medical Society was addressed by Dr. Joseph A. Gilchrist, of Toronto, on the treatment of Diabetes

Mellitus. Dr. Gilchrist said that to him accurate knowledge of the intake of food and output of sugar were most important and he considered the exact type of diet is of less importance, believing in a type of diet between the high fat variety and high sugar variety. His enthusiasm was very inspiring and his emphasis on the importance of searching exhaustively for toxic and infective factors impressed his hearers with the importance of approaching the study of their cases from that angle.

J. H. ELLIOTT

### Regina and District Medical Society Meeting

The early history of the medical profession of the territories together with accounts of experiences of the early days were related at the April meeting of the Regina and District Medical Society. Members of the District who had graduated 30 years or more ago were guests of honour at a banquet held in the Parliament Buildings. One of the older members from each of the other seven medical districts in the province was invited. Dr. William Hall of Fort Qu'Appelle who was unable to attend owing to ill-health, has the honour of the longest practice in the province. This year he observes the fiftieth anniversary of the commencement of his practice at Fort Qu'Appelle. A toast was proposed to the "Old Timers" by Dr. Lloyd Brown, youngest member of the profession in Regina. Dr. J. H. Knight of Moose Jaw responded. Dr. Knight, by virtue of years of practice, is dean of the profession in Saskatchewan. He graduated from what later became Queens' University in 1880, but has been in the West only 27 years.

Dr. David Low, the practitioner longest in Regina, gave a history of early medical legislation and early medical practice in the Territories. The first legislation was passed in 1885 and was known as Bill No. 11, the first clause of which read as follows: "Be it enacted by the Lieutenant-Governor of the Northwest Territories in Council as follows:—(1) The following persons and no others shall be allowed to practise surgery or midwifery in the Northwest Territories for hire, gain or hope of reward: All persons at the time of this ordinance actually residing in the Northwest Territories and who possess any medical degree or diploma from any university or college in Her Majesty's Dominions which is empowered by the law to grant medical or surgical degrees whereby such person is authorized to practise physic, surgery or midwifery or any license from any board or corporate body in Her Majesty's Dominions empowered by the law to grant licenses to practice physic, surgery or midwifery."

This ordinance made provision for the registration of all persons authorized under the Act to practice in the Territories. The original list, which is now in the possession of the Department of Public Health was made on the first type-

writer ever to be used in Regina. The list contained 44 names.

On December 11, 1888, the medical profession was incorporated under the name of "The College of Physicians and Surgeons, North West Territories." This body regulated the affairs of the profession and made provision for the election of the council. The personnel of the first council were as follows:

President, Dr. O. C. Edwards, Qu'Appelle Station; Vice-President, Dr. J. D. Laffery, Calgary; Registrar and Treasurer, Dr. R. B. Cotton, Regina; with Dr. R. G. Brett, Banff, and Dr. H. C. Wilson, Edmonton, as members.

Dr. T. A. Patrick, of Yorkton, the next speaker, graduated in 1888 from the University of Western Ontario, London, Ont. He came west exactly 44 years ago. Before graduation he saw three operations performed, and necessity soon forced him to perform operations which he had never seen; he made it a practice to read up the operation in three different text books so that he could see every step. Some men had what he called surgical courage or gumption, others never acquired it. He paid tribute to his colleague, Dr. Irving of Yorkton, who in an emergency which Dr. Patrick described displayed good surgical judgment and saved the patient's life. In closing, Dr. Patrick said that he had been practising long before many in his audience had even been thought of.

LILLIAN A. CHASE

#### **The Joint Meeting of the Toronto Physiological and Biochemical Societies and the Montreal Physiological Society\***

DRS. V. E. HENDERSON AND M. H. ROEPKE, reported on "The Mechanism of Parasympathetic Stimulation." While Babkin, Gibbs and Wolf; Babkin, Alley and Stavrakys; Gibbs and Szelosey; and ourselves, have shown that stimulation of the chorda tympani leads to local production of an acetylcholine-like substance (AC), proof was not furnished; however, that this did not arise owing to a stimulation of vasodilator nerves, or, antidromically, of sensory ones. Nor was it proved that AC was produced even in the presence of atropine adequate to depress secretion. Light is thrown on these points by this investigation. The vasodilatation appears to be due to the liberation of AC from gland endings. Attention was also called to the difficulty of explaining the physiology of bladder contraction merely on the liberation of AC on nerve stimulation. The great general physiological importance of this new conception of nerve action was briefly considered.

DR. E. J. KING, discussed the "Biochemistry of Silicic Acid." In view of the interest and importance attached to the problem of silicosis

it seemed worth while to undertake a study of the biochemistry of silica. In the present investigation analyses of several tissues for their content of silica have been made following a colorimetric procedure described elsewhere, and some experiments have been conducted on the fate of ingested and injected silicic acid.

It would appear that the quantity of silica appearing in the urine of an animal is probably dependent on the type of food on which it subsists. Carnivorous and omnivorous animals appear to have a much smaller urinary excretion of silicic acid than do herbivora. That the silica content of the urine may be influenced by the diet was shown by a feeding experiment in which four rabbits, which had been kept on whole oats and carrots, and which showed high urinary silica values, were placed for a month on a diet of white bread and tomato juice. The amount of silica excreted dropped almost immediately, and remained at a low level until the animals were returned to a whole oat, carrot and wheat straw diet, when the amounts of silica in the urine returned to much higher levels.

Silicon seems to be an invariable, though perhaps an incidental, constituent of protoplasm. Both the white and the yolk of the eggs of birds appear to contain small amounts, and several embryonic mammals have contained appreciable quantities, both in the whole fetus and in the individual organs. Administration of silica (5 g. of finely powdered quartz) into the stomach has resulted in a greatly increased output in the urine. When silicic acid (neutralized sodium silicate) was given by stomach tube the quantities of silicate in the urine were sometimes enormously enhanced. Dilute solutions of silicic acid containing about 1 mg. per c.c. and made up in saline were given by the continuous intravenous route over a period of several hours. When quantities of 100 to 200 mg. were given the response in urinary output of silica was prompt, rising to high values within the first hour, and reaching very high concentrations in the urine toward the end of the injection.

When a fine suspension of particulate silica in saline was injected over a period of several hours the silica content of the urine did not rise very greatly, being considerably less than when powdered quartz was given by mouth. During the injection the urine became bloody and later anuria developed. Death occurred after six hours. On histological examination no accumulation of the particles of silica appeared to have occurred in the glomeruli, but there was generalized degeneration of the tubular epithelium. The kidney had a normal silica content, but the spleen was definitely above normal. Injection of a solution of the glycol ester of silicic acid resulted in considerable increases in the "total" silica content of the blood and moderate increases in the

\* Held at McGill University on April 24, 1933.



urine. The blood appears capable of maintaining a much higher concentration of organic than of inorganic silicate. Introduction of silicic acid into the lungs by means of placing the animals in a fog of the solution, and by spraying the solution through a bronchoscope, led to increased urinary output, but it is not certain that this was due to absorption from the lungs.

On the basis of these experiments it is suggested that the kidneys possess a very low threshold for silica.

DRS. D. A. SCOTT AND A. F. CHARLES, reported on "Heparin." This is a substance which retards the coagulation of blood. It was originally obtained from certain extracts of the livers of dogs. The present authors have obtained large amounts of this substance from extracts of beef liver. The essential steps in its preparation are as follows: (1) the extraction of beef liver with an alkaline solution of ammonium sulphate; (2) digestion with trypsin; (3) fractionation with alcohol and acetone. The final product contains 5 units per mg. of solids and is readily soluble in water. Much greater purification can be effected by treatment with various organic solvents, *e.g.*, acetone and pyridine. A product containing 200 units per mg. was obtained. This product did not give a test for protein or for glycogen and was not destroyed by pepsin, trypsin or diastase. It was readily soluble in acid and in alkali. It was much more stable to treatment with alkali than to acid. It did not distil at 175° C. at a pressure of 0.001 mm. of mercury. Heating at this temperature for half an hour did not destroy its activity.

DRS. N. B. TAYLOR, C. B. WELD AND G. K. HARRISON, reported on the "Distension as a Cause of Death Following the Obstruction of the Duodenum in Dogs." Experiments were described in which rapid death was produced in dogs through distension of the bowel by means of a balloon inserted into the bowel lumen. Actual obstruction of the lumen was prevented by attaching a rubber tube 1/2 inch in diameter to the balloon. A barium mixture passed rapidly through the tube from the upper to the lower bowel level. These animals died in from 20 to 54 hours (average 28 hours).

TABLE I  
Blood NaCl mgrm. per 100 c.c.

Dog No.	Pre-operative	Before death	Fall in percentage	Survival time in hours
80	464	426	8	24
81	459	449	2	21
83	464	459	1	21
93	466	325	28	54
94	478	435	9	42

Blood chlorides of animals dying of distension of the bowel without obstruction.

That the fall in blood chloride was not the cause of death seems evident from the fact that a much greater reduction of chloride was produced without ill effects in unobstructed animals by means of histamine injections and gastric lavage.

TABLE II  
REDUCTION OF BLOOD CHLORIDE BY INJECTION OF HISTAMINE, GASTRIC LAVAGE AND AN EMETIC  
Blood chloride mgrm. 100 c.c. (NaCl)

Dog No.	Before treatment	After treatment	Fall in percentage	Duration of treatment, days
92	427	286	33	3
95	478	178	62	3 1/2

Animals in which the bowel segment was denervated before the insertion of the balloon did not show the signs of obstruction. They died of peritonitis following perforation of the bowel by the end of the rubber tube in from 70 to 80 hours.

Distension of the bowel by secretions and the stimulation thereby of afferent nerve endings in the bowel wall or mesentery are considered to be of primary importance in causing death in acute intestinal obstruction. Loss of chlorides is a contributory factor only.

#### The Vancouver Medical Association

At the annual meeting of the Vancouver Medical Association, held on April 25th, the following officers were elected: *President*, Dr. W. L. Pedlow; *Vice-president*, Dr. Anson C. Frost; *Hon. Treasurer*, Dr. W. T. Lockhart; *Hon. Secretary*, Dr. W. T. Ewing; *Editor*, Dr. J. H. MacDermot. The trustees of the Association are Drs. F. Brodie, J. A. Gillespie and W. D. Brydone-Jack.

That a kind word or a properly spoken request increases the workman's accuracy was observed in elevator men who more closely stop their cars level with the floor when the passengers say "14 please", "18 please", than they do when passengers say sharply or in a muffled voice "14", "18", or "21", as the case might be.—Harold S. Hulbert, M.D., in *The Bulletin of the American Association of Industrial Physicians and Surgeons*.

Mental health means more than being free from delusions, hallucinations, intellectual deterioration, or other symptoms that we associate with actual mental disease. Rather it is the nearest approach to a state of mind through which we may achieve maximum efficiency and greatest happiness, unhampered by habits and attitudes towards life that lead to varying degrees of failure.—Douglas A. Thom, M.D., in *Mental Hygiene Bulletin*.



## Special Correspondence

### The Edinburgh Letter

(From our own correspondent)

The death of Dr. Jas. R. Drever, the former Scottish Medical Secretary of the British Medical Association, which occurred on April 7th last, is deeply regretted in all parts of Scotland. He had been in fairly good health since his retirement in October, 1931, and was going about as usual till within a few days of his death. In his earlier days Dr. Drever qualified as a teacher, taking his M.A. degree at the University of Glasgow. He was, however, attracted to the study of medicine, and returning to the University he graduated M.B., Ch.B. in 1906. He built up a large general practice in Glasgow, and later specialized in diseases of the ear, nose and throat, being attached to the Victoria Infirmary, Glasgow, and the Bellahouston Dispensary. He had interested himself in the work of the Glasgow Branch of the British Medical Association immediately after qualifying, and was later elected a member of the Central Council of the Association and of the Insurance Acts Committee. In 1919, when the Council decided to appoint a Scottish Medical Secretary of the Association, Drever was at once recognised as the man for the post. During his tenure of office he performed a great amount of useful work for the Association and the Medical Services in Scotland. He was a member of the Hospital Services (Scotland) Committee which, in its Report issued in 1926, made far-reaching recommendations regarding the hospital services of the country. In 1926 he was elected a Fellow of the Royal College of Physicians of Edinburgh. Modest and unassuming by nature and of a philosophic turn of mind, his advice was greatly valued by the members of the profession and by bodies concerned in the administration of the health services. His ability, tact, and ripe experience proved exceedingly useful in many a difficult situation. On his retirement he was presented with a testimonial in recognition of his services to the Association.

The annual dinner of the Edinburgh Branch of the British Medical Association was held in the Scottish House of the Association on April 26th. Dr. Comrie, President of the Branch occupied the Chair. About seventy members and guests attended the dinner. Among those present were Sir Thomas Whitson, late Lord Provost of Edinburgh, Professor von Müller, Munich, Mr. J. W. Dowden, President of the Royal College of Surgeons of Edinburgh, Professor Wilkie, Professor Bramwell, Sir Henry Brackenbury, Chairman of Council of the British Medical Association, and representatives of the Board of Management of the Royal

Infirmary, Edinburgh, and of the Department of Health.

A statement regarding the hospital policy of the British Medical Association was made by Sir Henry Brackenbury during the course of the evening. He drew attention to the fact that of late years there had been very significant changes in the hospital position. The voluntary hospitals, instead of being institutions established and supported by a charitable public for the treatment of the sick poor, were gradually passing into another category, where provision was made by the public on a more or less self-supporting basis and where contributions were received from a very large proportion of the patients. There was another great change—the demand to be admitted to these hospitals was not exclusively confined to those who needed specialist treatment. Many people desired admission because, owing to the conditions in their homes, treatment in hospital was easier and much more efficient. In other words, their domestic or financial situation made it desirable that they should have the benefit of institutional treatment. Sir Henry elaborated four points or principles in the hospital policy of the British Medical Association with regard to these changes. The first was the need for hospital provision in which treatment could be given by the family doctor. The practitioner who was attending to the patients outside the hospital was perfectly capable of continuing his attendance upon them inside, provided they did not require specialist treatment. There ought therefore to be provision in every area for institutional accommodation where the general practitioner would be able to continue to treat his patient. The second point was the payment of the medical staffs of the voluntary hospitals. He made it clear that as long as persons were admitted to these hospitals who were unable to pay for their maintenance and treatment, so long would the medical staffs be perfectly willing to give their services gratuitously for the sake of such persons. But now there were very few such persons; nearly everyone who was admitted to a voluntary hospital was able and was expected to pay something, according to his means. It was, however, necessary to remember that these payments were not made for board and lodging, but were made in respect of the medical and surgical treatment they received, and there was consequently no reason why the doctor should be the last person to be removed from a charitable to a paying basis. The British Medical Association said that a proportion—they suggested 20 per cent—of whatever payment was made should be set aside as a staff fund to be given to the members of the medical staff to do what they liked with. This, of course, applied to payments made through organized contributory schemes. In the third place the

Association was definitely in favour of paying wards in connection with hospitals of all types for that class of persons whose incomes were above the limit of those for whom the voluntary hospitals were intended. This would be to the advantage alike of the public and of the profession. His last point concerned the appointment and character of the medical staffs of the transferred Poor Law hospitals who, in the past, had been mainly whole time officers. It would be a great advantage if those hospitals, like the voluntary hospitals, could have the benefit of a visiting staff of medical and surgical specialists. All these matters had been very carefully considered by the British Medical Association and were the opinions of the great majority of medical men in this country.

The death has just been announced of Dr. Howie, of Strathdon, Aberdeenshire. Dr. Howie had the distinction of being the first man to own a motor car in Scotland. He used to recall humorously how in the early days of motoring he was prosecuted for exceeding the statutory speed of four miles per hour. According to the Act of Parliament, he had to employ a man to walk in front of his car ringing a bell and waving a red flag.

R. W. CRAIG.

Edinburgh.

### The London Letter

(From our own correspondent)

The question of pollution of the atmosphere in our big cities has been referred to before in these notes and the excuse for mentioning it again is two-fold. In the first place, while the country as a whole can report a slight but definite improvement indicated in the scientific observations in the last official document, London has still little cause for congratulation with a tar deposit of 5.5 tons per square mile, nearly three and a half times the average for the last five years, and a definite increase in the amount of sulphur in the samples year by year. In the second place there has been in recent times a revival of interest in the respiratory group of disorders, coincident with the advent of serum therapy for pneumonia and it is being asked, not for the first time, what relation, if any, exists between a chemically laden external air and inflammation of the bronchi and deeper portions of the air passages. The sulphur in London air means in reality an acid mixture which is held to be responsible for the serious inroads made into the stonework of the Houses of Parliament. This is objective evidence of its potency, and what harm the same air may do to the delicate mucous membrane of the respiratory tract is unfortunately only a speculative matter. It has been said that the authorities

will not take the matter seriously until an eroded brick lays out some innocent member of parliament and the root of the trouble is really that the domestic chimney is the main source of the polluting substances, and all of us have a vested interest in opposing reform until a smokeless fuel with a cheerful burning appearance is invented. In his recent Milroy lectures in London, Dr. Robert Cruickshank, of Glasgow, has been dealing with the pneumococcal infections, and he reaches the conclusion from the bacteriological aspect that while lobar pneumonia is essentially exogenous—probably an infectious disease with a low degree of infectivity—the bronchopneumonic types of lung disease are endogenous, brought about by strains of bacteria already present when the resistance of the host is lowered. Among the factors which have to be considered is the atmospheric one, and any campaign against lung infections must obviously link up with the work of the Smoke Abatement Society. As long ago as 1661 an English king commanded John Evelyn to write a pamphlet on smoke abatement which has become a classic. Perhaps by the tercentenary something may be done about it.

Quite the most discussed topic during the last month in London has been the dispute about the new specialist and consultant service of the London County Council. Since a new negotiating committee has been recently appointed by the Council of the British Medical Association and a distinctly conciliatory letter has been forwarded from the British Medical Association to the London County Council it is perhaps unnecessary to outline the less pleasant features of the dispute which has led to several curious outbursts of personalities. But the principles at stake are believed by many to be vital to the future of consultant medical practice in the whole country, so that some points in the dispute should perhaps be touched on here. It should be remembered that under the Local Government Act of 1929 the reorganization of the old poor-law institutions was handed over to the various municipal bodies, and in London over 100,000 beds came under the County Council's care with the necessity of bringing the hospitals now under their care up to a much higher status, and included in the program of reform was the provision of consultant and specialist services. Now the Act lays it down quite clearly that the development of these services was to be undertaken after consultation with the specialists concerned, and in London it is felt that this has not occurred. Certainly it is agreed that the exact details of the new scheme were not revealed to a subcommittee of specialists until they had been passed by the County Council and now that they are passed it is stated that they cannot be altered. Many of the details are felt to be unfair, and the whole principle



behind the scheme seems unsatisfactory to a section of the profession which has always very much controlled its own appointments and recruiting. The idea of leaving such appointing to a body which is larger than most of the parliaments of Europe and essentially a political organization needs some swallowing, and yet it is probably but a step towards the state medicine of the future. It is particularly because this is the first step that it is so important to have no mistakes and no animosity. Both sides have a case, and perhaps before the next of these letters appears they will have met and explained what they really mean.

What the French would call a *gaffe* has recently been committed by some enthusiastic advertising manager of the Post Office Telephone Service. The public were told in glowing terms that many bills for needless visits could be saved by use of the telephone. "In times of doubt" ran the legend, "ring up your doctor, and in a few minutes that reassuring voice will be telling you what you should do, and whether the cost of a visit need be incurred." Since advice is the doctor's main saleable article it seems grossly unfair to suggest that it may be obtained over the telephone for nothing. Perhaps the medical profession might retaliate by advertising to tell the public how to make calls from an automatic telephone box without payment—if it could induce the ingenious young engineer recently convicted of this before London magistrates to reveal his secret. Actually all that the profession does is to make a dignified protest—this has been well done already by the Regius Professor of Physic at Cambridge—and point out that if those of its members under contract with another Government Department to carry out work among insured people were to make use of the telephone to save "needless" visits there would be a severe lecture in store if anything went wrong and the practice was discovered. The telephone is sufficiently a nuisance to the tired practitioner as it is, without official encouragement.

ALAN MONCRIEFF.

London.

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Dr. Louis I. Dublin, in his study of the records of 40,000 graduates from eight colleges of classes from 1870 to 1905, finds that "for all colleges except Yale, athletes have a moderately higher mortality than their fellows, but a distinctly higher one than men of high scholastic rank. Relatively fewer athletes, in general, live on to old age than their college mates."

## Letters, Notes and Queries

### Cost of German Medical Journals\*

#### To the Editor:

One year ago when the first voices of protest against the high price of German medical journals became loud I wrote to an outstanding publishing house in Munich in this matter and received a letter in reply which I translated and herewith submit for publication in the *Canadian Medical Association Journal*. I think that it is only fair to hear the other side.

HERMANN SCHROEDER, M.D., PH.D.,  
Department of Pharmacology,  
McGill University,  
April 5, 1933.

#### Answer:

Your letter, sent to the Editor of the *Müncheuer Medizinische Wochenschrift*, was submitted to us for answer, because of our experience regarding journals and since we know best the present situation of the German publishing houses.

There have been frequent complaints of the high prices of German journals, especially from the American side. We believe, however, that the unusual German conditions are not considered sufficiently. We want to state first that these complaints can concern only highly scientific and special journals, since the weekly periodicals, especially the medical ones, are cheaper in Germany than in America. Here too, one has to consider the fact that the cost for postage involves a not inconsiderable increase in expenditure. If some of these German journals offer a little less than corresponding journals in America and England, this is due to the smaller number of advertisements which have to carry the bulk of the expenses. If, e.g., our journal contains only 20 pages of advertisements and the leading medical journals in America 40, it is obvious that they can offer more than we. German industry is run down so considerably at the present time that it cannot afford so much advertising as American and English industry.

The main reason for the high prices of our journals lies in the limited number of subscribers. Special journals in English can rely upon a much greater circulation than German ones, which have their main market in German-speaking countries, and are otherwise subscribed for by only the larger foreign libraries. A journal, e.g., which has 400 subscribers in

\* This correspondence should be read in conjunction with an Editorial Comment on the same topic which appeared in our April issue, page 428.—EDITOR.

Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.



Germany would have probably at least 800 in America. That means a doubling of the income for the American journal, since the cost of production is almost the same whether 400 or 800 copies are printed. You know that type-setting, etc., comprise the greater part of the expenditure, while the printing of a few hundred copies more or less makes scarcely any difference. Under these circumstances, you in America are able to sell a journal for half of the price we have to ask in order to cover expenses.

You would be mistaken if you assumed that the relatively high subscription prices of some German scientific journals represent exploitation on the part of their publishers. One makes scarcely any money on these journals. In many cases there is even a deficit. If a large proportion of the American libraries should cease subscribing for German journals, the publishers would necessarily be forced to raise the prices, since in such a case the cost of production would have to be paid by an even smaller number of subscribers. Quite recently the price of most of the German journals has been reduced about 10 per cent, since the cost of production has become lower also. This reduction is scarcely bearable and is a burden almost exclusively to the German publisher, since the number of subscribers of nearly all journals has diminished, due to the economic condition. We have lost, e.g., since the end of 1930, almost 20 per cent of the subscribers of a certain journal published by us, which means a reduction of 20 per cent in our receipts also. On the other hand, the cost of production is only 10 per cent lower. If we have only 400 subscribers instead of 500 for this journal, our expenditure, apart from the 10 per cent reduction in the cost of production, has stayed the same. How are we to reduce the price of subscription if this journal has caused already a yearly deficit of several thousand marks?

The foreign, especially the English, journals, work under quite different conditions. They have, in addition to their greater market, often considerable public means and endowments. One has also to take into consideration that more of the purely scientific journals are published in Germany than in any other country, due to the high standing of scientific research. It is therefore obvious that the journals—especially in times of economic depression—circulate only to a limited extent. In spite of all, it would probably mean a great loss for the scientific progress of the whole world if we in Germany were forced to discontinue a great number of these journals.

Finally, one feels that it is wrong if people in America talk about the high prices of the German journals in general. All German publishers cannot be classed together. I must admit that the prices of several journals published

by a certain publishing house cause surprise in Germany too. The same is true for scientific books. It is very regrettable that the whole publishing business in Germany must suffer because of one exceptional case.

F. LEHMANN.

Munich, Germany,  
July 14, 1932.

## Abstracts from Current Literature

### Medicine

**The Significance of Electrocardiograms of the Low-Voltage Variety.** Cassidy, M. A. and Russell, H. B., *Brit. M. J.*, 1932, 2: 1177.

The authors have examined the electrocardiograms of 720 cases and have grouped all those showing low-voltage curves in any one or in all three leads. Only those cases showing a measurement of 7 m.m. or less between the top of the R and the bottom of the S wave have been included. A low-voltage curve in lead 3 alone is quite common and is apparently of no pathological significance. In lead 1 alone such a curve is found as frequently with normal as with abnormal hearts and is insignificant if unassociated with other electrocardiographic abnormality. Low-voltage curves in lead 2 alone, or in all three leads, are particularly liable to occur in cases of cardiovascular degeneration and their presence in such cases indicates a poor prognosis. The significance of such curves is of no great import unless considered in conjunction with other factors of the case; if this is done, their occurrence may be of great prognostic value.

W. FORD CONNELL

**Idiopathic Steatorrhœa (Gee's Disease).** Bennett, T. I., Hunter D. and Vaughan, J. M., *Quart. J. Med.*, 1932, 1: 603.

A group of 15 cases is described. All were adolescents or adults who had never been out of Britain and they showed the following main features: fatty stools, with or without diarrhœa, tetany, osteomalacia, anæmia of various types, skin lesions and frequently infantilism. In 12 cases there was evidence that the malady had originated in childhood, beginning as cœliac disease. These cases have been most thoroughly investigated. It is considered that they are distinct from tropical sprue which always begins in adult life, and also from congenital steatorrhœa and pancreatic infantilism. Steatorrhœa with a preponderance of split and neutralized fat, and disturbances of calcium metabolism are found in every case. Skeletal changes were constant—osteoporosis, florid rickets, or typical osteomalacia. Glossitis, achlorhydria, diarrhœa, clubbing of the fingers, and lenticular opacities

were all found in a proportion of the cases. The anæmia, when present, was sometimes hypochromic, sometimes hyperchromic megalocytic, and in two cases was erythroblastic in type (often called Von Jaksch's anæmia). The sugar tolerance curves were flat and the serum calcium constantly low. The clinical picture is felt to depend on disturbance of gastro-intestinal function, resulting in deficient production, absorption or utilization of one or more essential factors. The patients, crippled by osteomalacia, or incapacitated by tetany, or threatened with death owing to the severity of the anæmia present, are "starving in the midst of plenty." The treatment has been found difficult. The steatorrhœa is controlled by low fat diets, the carbohydrate dyspepsia by regulating starch intake; calcium is given for the tetany and for the osseous condition. Vitamin D is given as radiostol tablets (British Drug Houses), since cod liver oil is not well assimilated by these patients. Iron, marmite and liver are all used for the anæmias, depending on the type present.

W. FORD CONNELL

**Traumatism and Diabetes Mellitus.** Liebig, H., *Med. Klin.*, 1932, 28: 357.

During the war the almost classical conception of a traumatic diabetes was generally discredited, for it was very rare to encounter a case of a wounded or shell-shocked soldier who had developed glycosuria of a lasting nature as a result of his injury. V. Noorden, Isaacs and Umber did not admit a diabetes of a purely traumatic origin, but claimed that this type of case was simply one in which a pre-existing diabetes had been disclosed or exaggerated by a shock or injury. The author is convinced, however, that a really traumatic diabetes does occur, even in civil practice, and that the medico-legal importance of such cases should be borne in mind. Several cases are cited in support of this contention. In 3 cases the shock was considered to be purely of a psychic nature; in 2 cases the psychic element predominated, while in 4 the injury was largely physical. The interval from injury to the diagnosis of diabetes ranged from 2 days to 9 years, although the interval was less than 6 weeks in 7 of the 9 cases. In 2 cases there was some suggestion of hereditary weakness. Most of the patients were young people. A high mortality was observed, with death in 4 cases, although there was only one case in which the disease was considered to be severe. A typical case is described: a man of 52 received a slight injury of his left eye in a railway accident. However, he was severely shocked as the carriage in which he was riding fell from a 30 foot bridge and 5 of his companions were killed. He was taken to a hospital in Paris and 8 days after the accident sugar was found in his urine. The patient had been in the habit of having bimonthly urinalyses and

at no time had glycosuria been observed. His diabetes persisted and the railway company admitted the traumatic origin of the disease. In this regard it is interesting to note the relative frequency of diabetes among railway locomotive mechanics.

It is not possible to differentiate between true traumatic diabetes and a transient post-traumatic glycosuria except by prolonged observation, and in dealing with this type of case no admission should be made of the traumatic origin of the disease without a most careful and detailed study of the case.

L. G. MONTGOMERY

**Further Observations on the Heart in Old Age. A Post-mortem Study of 381 Patients Aged Seventy Years or More.** Willius, F. A. and Smith, H. L., *Am. Heart J.*, 1932, 7: 170.

This article represents the second report by the authors on their study of the heart in old age. The first dealt with the clinical aspect; the present report is an analysis of the records of necropsy findings in aged patients. A review of 5,751 post-mortems showed 381 cases over the age of 70, an incidence of 6.6 per cent. These 381 cases form the basis of the present report. Final conclusions show that the hearts of persons who live to an old age are of remarkable quality. In the series only 12.6 per cent died of heart disease. Varying degrees of coronary sclerosis occurred in all cases, but the involvement was moderate to advanced in 72.5 per cent of them. Aortic sclerosis was also a constant finding and existed from a moderate to a marked degree in 80 per cent. Sclerosis of the valves was found in 92.7 per cent. An analysis of the blood pressure readings indicated a tendency to hypertension. Cardiac disease other than arteriosclerosis existed in 16.4 per cent. The causes of death in the whole series were diverse, carcinoma leading the list, being responsible for 24.4 per cent of cases.

W. H. HATFIELD

**Studies in Tobacco Hypersensitivity I.** Sulzberger, M. B., *J. Immunol.*, 1933, 24: 85.

Skin reactions to patch tests with extracts of tobacco resulted in three types of response: (1) eczematous reactions; (2) immediate wheal and flare reactions; (3) late reactions. Passive transfer of this tobacco sensitivity was accomplished by the Prausitz-Kuestner method. The reactions were shown to be due to some constituent of tobacco other than nicotine.

Reactions were obtained in normal individuals who smoked cigarettes, but they were weak reactions. Strong reactions were obtained in several cases of thrombo-angiitis obliterans, but not invariably.

The author feels these results lend support to the theory that tobacco is etiologically related to thrombo-angiitis obliterans, but not because tobacco is toxic, rather because of the develop-



ment of hypersensitivity to tobacco. The occurrence of tobacco sensitivity in other conditions is being investigated further.

T. G. HEATON

**Functional Bundle-Branch Block (Partial) Paradoxically Relieved by Stimulation.** Sigler, L. H., *Am. J. M. Sc.*, 1933, 185: 211.

Although admitting that bundle-branch block is usually caused by anatomical changes affecting one of the bundle-branches, Sigler draws attention to the fact that certain functional disturbances may lead to the same electrocardiographic changes. He quotes Wolff, White and Parkinson who reported 11 cases of bundle-branch block occurring in young and otherwise healthy people in whom the block was abolished by exercise or atropine. Sigler's case was a man of forty-one years, seen because of short attacks of anginal pain occurring spontaneously every three days. Examination revealed no evidence of heart disease. The electrocardiogram showed an incidence in the Q-R-S conduction time to 0.12 second with marked slurring and notching and low voltage. After the patient had hopped thirty times on one leg the electrocardiogram was unchanged. The effect was not abolished by exercise. Right vagal stimulation by pressure on the carotid sinus had little or no effect but similar stimulation of the left vagus reduced the Q-R-S conduction time to 0.06 second and abolished the notching and slurring. They feel that the bundle-branch block in this case was caused either by vagal inhibition or fatigue—probably the latter. Vagus stimulation caused enough slowing of the heart to permit normal bundle-branch conduction.

E. S. MILLS

**Report of a case of Hyperinsulinism cured by Surgical Intervention.** Derick, C. L., Newton, F. C., Schulz, R. Z., Bowie, M. A. and Pokorny, N. A., *New Eng. J. Med.*, 1933, 6: 208.

A woman aged 56 had attacks of faintness which came on after meals and were associated with over-fatigue and accompanied by profuse sweating. A glass of malted milk would abort the attacks. At first it was thought she had neurasthema, but fasting blood sugar determinations showed 65 and 58 mg. of sugar per cent on two different occasions. A sugar tolerance test (92 g. of glucose by mouth) resulted in raising the blood sugar to only 78 mg. per cent. When the same amount was given intravenously the blood sugar went to 211 mg. per cent in half an hour and dropped to 27 mg. per cent in two hours.

Six years after the attacks began she consented to an operation. A small tumour, weighing sixteen and one-half grm., was removed from the tail of the pancreas. Physiological examination showed this to be rich in insulin.

This is the oldest patient on record in whom a neoplasm arising from an island of Langerhans has been found. It is one of the few cases where the benignity of the tumour is unquestioned.

Twenty months after the operation her fasting blood-sugar was 70 mg. per cent. She was physically well and able to care for her own home. She is quite comfortable on three small meals daily.

LILLIAN A. CHASE

**Aleukæmic Myelosis with Osteosclerosis.**

Stephens, D. J. and Bredeck, J. F., *Ann. Int. Med.*, 1933, 6: 1087.

The authors present 2 cases, and have collected 24 from the literature, in which osteosclerosis is associated with splenomegaly, the presence of myelocytes and myeloblasts in the circulating blood, a normal or but slightly increased white cell count, and an anæmia of the regenerative type.

The osteosclerosis is thought to be hereditary. The character and degree of the blood changes depend on the extent of the displacement of medullary tissue by newly-formed bone and loose connective tissue. The splenic enlargement can be shown by splenic puncture and at autopsy to be due to infiltration and proliferation of myelogenous cells. This may possibly be a compensatory mechanism. The myelocytes and myeloblasts in the blood do not as a rule exceed 20 per cent. The low total white cell count aids in differentiating the condition from a true leukæmia. Anæmia is present in about a third of the cases, and its degree varies greatly from case to case. Normoblasts, punctate basophilia, polychromatophilia, and changes in the size and shape of the red cells may be found.

The condition occurs with about equal frequency in the two sexes. Commonly found in infancy and childhood, it may persist well into adult life without symptoms other than a slowly progressive anæmia. It is the splenic tumour that most often causes the patient to seek medical advice. Although the lymph glands are infiltrated by the primitive cells, they do not show clinical enlargement. The x-ray findings suggest metastatic carcinomatosis of bone with reactive sclerosis, but the long history and the inability to find a primary growth or secondaries elsewhere should throw doubt on the diagnosis. The Bence-Jones protein is absent from the urine. Biopsy will establish the diagnosis of osteosclerosis.

X-ray treatment of the spleen is believed to be contraindicated.

H. GODFREY BIRD

**Surgery**

**Adamantine Epithelioma.** Kegel, R. F. C., *Arch. Surg.*, 1932, 25: 498.

Kegel reports a series of this somewhat rare malignant lesion of the jaws. In 29 the site was in the lower jaw and in 6, the upper jaw.



In the lower jaw, the molars are most frequently affected, while the bicuspid, canines and incisors are seldom involved. All of the tumours of the upper jaw involved the antrum. Of the group of 17 patients from the surgical wards of the Johns Hopkins Hospital 11 were coloured and 6 were white. The tumour was usually first noticed between the ages of 11 and 35 years. The extremes of age were 7 and 53 years. While the duration of the tumour was lengthy the rate of growth was slow. Seven cases showed a duration of fifteen years or more. Pain occurred rarely and usually in the early stage of the lesion. On account of the facial deformity the patient sought relief. The tumour presents a symmetrical, usually lobulated swelling of the jaw, which extends outward and encroaches but little on the buccal cavity. In Kegel's series there was no evidence of lymphatic enlargement. With expansion of bone, rupture occurs with discharge of fluid into the oral cavity. This occurred in 20 cases. A fistula commonly resulted. In 3 cases osteomyelitis developed. The antrum of Highmore was usually involved by extension of the tumour when the upper jaw was the site of growth. The roentgen appearance of the adamantinoma of the lower jaw is that of a central bone expansive tumour, and may be either monocystic or polycystic. The gross pathological appearance is characteristic, there being two groups, a cystic and the solid or there may be a combination of these. Microscopically the fundamental cell type is the basal cell, but all the degrees of differentiation of the enamel organ are found. The origin of the adamantinoma is still in dispute. Curettage, followed by chemical and thermal cautery, as advocated by Bloodgood, is the treatment advised by the author. The prognosis is not good, although in one instance in Kegel's series there was freedom from recurrence for eleven years.

G. E. LEARMONTH

#### A Survey of 340 cases of Acute Appendicitis.

Black, J. M., *Brit. M. J.*, 1932, 2: 1136.

The author reports 340 cases of acute appendicitis operated upon between December, 1927, and December, 1931. All cases were operated upon within a few hours of admission. In 13 cases the appendix was not removed. The average duration of symptoms before operation was 15 hours in acute non-perforated cases, 80 hours in perforated cases with local peritonitis or abscess formation, and 56 hours in cases with generalized peritonitis. The mortality in the three groups was 0.49, 4.7, and 18.4 per cent respectively. In practically every case delay was due to attempts at home treatment before calling a doctor. A large number had had doses of strong purgatives, a fact that is felt to be of importance in the rapid advancement of the disease. Seven of the 14 fatal cases had a pelvic

appendix. The ages varied from 2 to 71 years: 55 per cent occurred in males.

Three hundred and thirty of the cases showed evidence of obstructive appendicitis. Obstruction was due to faecal concretion or foreign body, fibrous stricture, kinking by extra-appendiceal adhesions, and torsion of the meso-appendix in order of frequency. The frequency of general appendicitis was believed due to (1) acute obstructive type of disease (2) frequent administration of purgative and (3) delay in intervention. General peritonitis was treated by enterostomy, *B. Welchii* antitoxin, and bile enemata. Enterostomy was done in 21 cases, 14 recovering. Six per cent dextrose in normal saline was put into the efferent bowel. The enterostomy tube was brought out through the omentum. Two developed a faecal fistula which closed spontaneously. *B. Welchii* antitoxin in 40 c.c. daily doses (up to 4) was given in 27 cases, some of which also had an enterostomy: 19 cases recovered. The antitoxin was given intravenously at operation, intramuscularly afterwards. One-half to two ounces of bile in six ounces of normal saline was given as an enema every four hours in 5 cases. It seemed to act extremely well.

STUART GORDON

#### Acute Osteomyelitis of the Vertebrae. Klein, H. M., *Arch. Surg.*, 1933, 26: 169.

In contrast to osteomyelitis of the long bones, the presumable portal of entry of infection can be established in nearly every case of osteomyelitis of the vertebrae. Trauma does not seem to play any rôle in the etiology. The patients all appear to be suffering from an infection, with the customary manifestations of fever, tachycardia, leukocytosis, and albuminuria. Objective evidence of a local pathological process does not develop for at least ten days. The outstanding local characteristic is pain, particularly on movement of the spine. Local tenderness over the spinous processes is not constant. Signs of local inflammation generally indicate perforation, and are most commonly present when the laminae or processes are affected, but may be present in exclusive involvement of the vertebral bodies. Local deformity may occur owing to collapse of the diseased vertebrae. Generally there is only transient deformity, due perhaps to muscle spasm, which disappears with the subsidence of inflammation.

These cases may be divided into four clinical groups.

Group 1. The most frequent group is that in which the patient presents a variety of complaints referable to the nervous system. The signs are generally due to involvement of the nerve roots by the inflammatory exudate, or to compression of the spinal cord which is consequent on pachymeningitis or epidural abscess, the result of perforation of the osteomyelitic focus.

Group 2. This group displays the clinical picture of abscess-formation. The abscess generally presents in the back, near the vertebral column. The next most frequent situation for this is the region of the psoas magnus muscle. A tremendous collection of pus may be present here and yet not cause a swelling conspicuous enough to be detected by careful examination. Pus arising from lumbar or sacral vertebrae may gravitate down along the tissue planes and pass through the major sciatic foramen, to present in the buttock, or may pass through the minor sciatic foramen and present beside the anus. Occasionally the mediastinum is the seat of abscess formation.

Group 3. Patients who present only pain in the back and fever. X-ray examination of the painful segments of the spine may yield negative results despite months of suppuration. Diagnosis of these cases may be established only by operation.

Group 4. Those who suffer from a widespread suppuration, with multiple abscesses, consequent on a bacteriæmia. In a few of these cases the osteomyelitic focus is itself the source of a bacteriæmia.

The mortality rate in series of these cases reported by various authors varies from 51 to 71 per cent. The essential feature in treatment is adequate drainage of the bone itself. Drainage of complicating infections, such as epidural abscess, is not sufficient. The presence of metastatic foci does not contraindicate operation. Recovery may occur after operation despite the presence of bacteria and a pleocytosis in the cerebrospinal fluid.

FRANK A. TURNBULL

### Obstetrics and Gynæcology

**Injury to Ureters, including Accidental Ligation during Pelvic Operations.** Newell, Q. U., *Am. J. Obst. & Gyn.*, 1933, 25: 220.

From the large number of cases of ureteral injury reported, it is evident that the accident is a surgical complication far more common than one would suspect. No doubt some unilateral ligations occur during the course of pelvic operation and are unrecognized, the ultimate result being death of the kidney on the corresponding side. The accident is liable to follow almost any pelvic operation, but usually occurs after radical abdominal and vaginal hysterectomies. In most cases the injury is unilateral. In a certain number of cases both ureters are involved. The most common sequelæ of ureteral injury are vaginal and abdominal fistulas. As a surgical complication, ureteral injury is responsible for a certain number of deaths. Prophylaxis is most important. Should a ligature or clamp be placed on a ureter and serious damage be inflicted, immediate repair should be done in the form of uretero-ureteral or

ureterovesical anastomosis. In cases of bilateral occlusion discovered a few days after operation, removal of the ligatures is indicated if the patient's condition can stand the strain of a serious operation; if not nephrostomy with drainage should be performed. Nephrostomy is a life-saving operation and should be done in all cases of double ureteral obstruction when the patient's condition is grave. Vaginal correction of uretero-vaginal fistula is unsatisfactory. Abdominal operation is the choice either in the form of ureteral anastomosis or nephrectomy. An operation designed to correct a damaged ureter should aim to preserve the normal ureteral and kidney function. ROSS MITCHELL

**Rupture of the Graafian Follicle, the Corpus Luteum and Small Follicle or Lutein Cysts, simulating Appendicitis.** Meigs, J. V. and Hoyt, W. F., *Am. J. Obst. & Gyn.*, 1933, 25: 532.

Twenty-five patients with rupture or bleeding from the ovary have been recently operated upon at the Massachusetts General Hospital. Most of them gave a history clearly simulating a mild attack of appendicitis. They had pain, nausea and occasionally vomiting. There was tenderness and spasm of the lower abdomen and tenderness by rectum. Temperature and pulse were often slightly elevated, the urine usually negative, and the white cell count a little increased. The pain of appendicitis is usually gradual in onset, whereas in rupture of the ovary, whether mild or severe, it is almost always very sudden. The sudden onset of pain and the relation of the pain to the oncoming catamenia are the two most important points in differential diagnosis. Rest in bed and careful observation might prevent unnecessary operations for "mild acute appendicitis." Yet in reporting these cases and drawing the conclusions the authors feel a responsibility, lest careless observation and unnecessary delay might endanger the life of a woman actually with acute appendicitis.

ROSS MITCHELL

**Lesions of the Placental Vessels: Their Relationship to the Pathology of the Placenta; Their Effect upon Fetal Morbidity and Mortality.** Montgomery, T. L., *Am. J. Obst. & Gyn.*, 1933, 25: 320.

A brief outline of the acute inflammatory reactions of the placenta and placental vessels is presented. It is shown that the milder types of acute inflammation begin in the membranes. The margin of the placenta and the amniotic surfaces of the placenta are next involved. When the inflammation is more advanced a leucocytic infiltration of the placental vessels and cord vessels take place; in the severe or extensive types of inflammation thrombosis occurs. Only in the most severe type of inflammation does the condition in the placenta react



unfavourably on the child. Certain placental vessel lesions of an alterative or obliterative type have been studied. They are found with necrosis of the placenta. The vessel lesions appear secondary to degeneration of the chorionic epithelium rather than primary. This is true not only when necrosis is of the so-called physiological type but also when it is so extensive as to impair the vitality of the embryo. The dictum that "the placenta is as old as its vessels" is not applicable; in reality the placenta is as old as its chorionic epithelium.

Certain views are presented as to the cause of premature and extensive necrosis of the placenta. They are based upon clinical and histological studies. The most likely explanation appears that the fertilized ovum, either because of hereditary influences or because of the effect of internal secretions, departs from the normal in its growth activity. This departure from normal may be in the direction of a short life cycle, to eventuate in premature necrosis, or in the direction of rapid growth and hyperplasia, to produce hydatidiform mole and chorionepithelioma.

ROSS MITCHELL

### Urology

**The Transurethral Application of Ultraviolet Irradiation and Ventilation to the Interior of the Bladder for the Relief of Tuberculosis and other Infections of this Organ.** Caulk, J. R. and Ewerhardt, F. H., *J. Urol.*, 1932 28: 503.

Bladder irritation is the most troublesome symptom of tuberculosis of the urinary tract, and it is for this that patients seek relief. If the disease is unilateral removal of the offending kidney may bring about a prompt cure, but there are cases in which the bladder irritation may persist for years and resist all forms of treatment. The writer cites such a case in which the bladder symptoms remained exceedingly troublesome for nine years and progressed, despite the fact that the other kidney was normal.

In searching for a remedy it occurred to the author that since the tubercle bacillus is so susceptible to fresh air and sunshine that if these agents could be administered to the interior of the bladder much benefit might result. Accordingly, an applicator was insulated with metal to protect the urethra and its tip insulated with shellac to protect the bladder wall. Through the insulating sheath a tube was incorporated for the insufflation with air. With this instrument it was found to be a very simple matter to ventilate and radiate the bladder.

Treatment was administered to the case in question, starting with a five seconds' exposure and gradually increasing to five and then ten seconds each day. After the first four applications the urine which had for months contained

pus, blood and colon bacilli, became perfectly clear and free from bacteria. The symptomatic improvement was equally marked and was most striking. Cystoscopic observation showed first a hyperæmia with, at the end of two weeks, a complete healing of the inflammatory process. After three weeks a large tuberculous ulcer exhibited pronounced healing.

The bacterium is killed because there is an initial absorption of ultraviolet rays by certain definite molecules, which in turn cause its destruction. Apparently, different species of bacteria offer a greater or lesser degree of resistance to different wave-bands, but there is a range of wave-lengths within which bacteria have been killed. This range is 3130 to 2250 Angström units. A technical discussion of the various types of rays is included.

The authors feel that the method offers great possibilities and urge that others try it.

N. E. BERRY

### Ophthalmology

**The Use of Tuberculin in Diagnosis and Treatment in Ophthalmology.** Eggston, A. A., *Arch. Opth.*, 1932, 8: 671.

The use of tuberculin as a diagnostic measure is becoming more general as newer and more reliable methods of application have been developed. While this is true of its use in detecting the tuberculous status of patients, its use as a measure of treatment has practically suffered the fate of therapeutic nihilism by specialists in tuberculosis. The experiments and opinions of the most profound students of tuberculosis prove that two distinct tissue responses occur following the development of an organized tubercle in the body. These consist of the development of a bacterial immunity in which the usual anti-bodies can be demonstrated, and in addition hypersensitiveness and allergy demonstrable by the reaction of the skin or mucous membrane to the by-products of the growth of the tubercle organisms. These by-products are chemically complicated substances consisting of nucleoproteins, carbohydrates and fats, and are designated as tuberculin. It is held rather dogmatically that a positive reaction to tuberculin signifies an infection with tuberculosis, either actively progressing or of a healed or latent nature. As most people after their second year have had a tubercle in some location in the body, from 40 to 75 per cent give a positive tuberculin reaction of some degree.

The ocular lesions frequently diagnosed as tuberculosis in a patient with positive reaction to tuberculin are really not due to infection by tubercle bacilli with the formation of a tubercle, but are of an allergic nature, if they are in any way related to tuberculosis. Actual tuberculous infection of the eye is relatively rare.



Injections of tuberculin are of value in the allergic cases, if given properly in order to desensitize a patient, but of questionable value in the active tuberculous ones. Tuberculin is the foreign protein of choice if the cellular metabolic mechanism of the tissue is to be excited, as a greater response occurs to a protein if there is cellular sensitization.

S. HANFORD MCKEE

**Primary Sarcoma of the Conjunctival Fornix Recurring at the Corneal-Scleral Junction.**  
Rifat, A., *Ann. d'Ocul.*, 1932, 169: 308.

In a woman of 60 years, in whose antecedents there was no history of cancer, a fuso-cellular pigmented sarcoma appeared in the conjunctival sac. A year later the limbus became the site of a recurrence, necessitating the enucleation of the eye.

The growth of the tumour of the conjunctiva was remarkable for its rapidity, and by the presence of the number of irregular nodes of a large size. Mitotic figures were frequently seen showing the tendency to malignancy. The tumour had developed on the conjunctiva, and did not cause either ulceration or epiconjunctival vegetation.

The growth at the limbus ran a relatively slow course, and seemed to be the result of an embolic deposit at the level of the inferior part of the cornea. This tumour developed without pain or metastasis. Certain authors believe sarcoma of the limbus begins either in the cornea, sclera or conjunctiva, while Legrange is of the opinion that this affection always has a conjunctival origin, from which it spreads to the cornea and sclera. This tumour started at the limbus of the conjunctiva, but did not penetrate the corneo-scleral wall. We know that invasion of this part by sarcoma is very rare. In a case where the cornea is involved, the sarcomatous tissue appears between Bowman's membrane and the epithelium, raising the latter. Very rarely it enters the layers of the cornea and sclera, and attacks the interior of the eye.

S. HANFORD MCKEE

**Ocular Diabetes.** Arruga, H., *Arch. de oftal. hispano-am.*, 1932, 33: 356.

The frequency of ocular complications in diabetes in 20,000 patients coincides with Uhthoff's statistics. The cases of cataract are mostly of the senile variety, associated with diabetes. Pure diabetic cataract is rare. The operative indications in each case must be solved by the oculist and internist, the former being guided by the condition of the retina and ocular tension; and the latter by the general condition of the patient. It is necessary to normalize the arterial tension, to avoid acetonæmia or acidosis, and to reduce glycæmia to its normal limits, placing the patient in the best possible condition for defence. When a high arterial tension per-

sists blood-letting half an hour before the operation is indicated.

Diabetic retinitis is most serious when associated with hæmorrhagic glaucoma. It is the consequence of sclerosis and degeneration of the retinal blood vessels. The amount of blood sugar bears no relation to its production. It is often associated with albuminuria, and it is often difficult to determine which is the responsible etiological factor. From a pathological point of view, the lesions consist of an obliterating arteritis with fatty degeneration, sclerosis of the vessel walls, and hæmorrhages. In retinal lipæmia, hæmorrhagic glaucoma is a most serious complication. It is the result of advanced sclerotic vascular lesions with a hæmorrhagic tendency. Iritis is discussed, retrobulbar neuritis, refractive disturbances, ocular paralysis, and hypotonia. The latter is found in all cases of diabetes and is of great diagnostic value. Two-thirds of the patients die within two years.

S. HANFORD MCKEE

**Hygiene and Public Health**  
**Why have Deaths from Exophthalmic Goitre Increased?** Statistical Bulletin, Metropolitan Life Insurance Company, 1932, 13: 7.

Apparently the increased knowledge regarding the prevention and treatment of exophthalmic or toxic goitre has not resulted in a decline in the death rate. Like diabetes, which might also have been expected to decline, goitre has increased in its incidence so far as death records show. The reason for this is not clear. It is possible that an improvement in diagnostic methods may have resulted in an increased apparent incidence of the disease, but it would seem unlikely that the whole increase in mortality rates could be accounted for in this way. The records of the Industrial Department of the Metropolitan Life Insurance Co. show that the death rate for exophthalmic goitre has increased 133 per cent for males and 65 per cent for females during the ten year period 1922-1931, as compared with the ten year period 1911-1920. The following table gives the actual mortality rates according to age and sex.

DEATH RATES PER 100 000 FROM EXOPHTHALMIC GOITRE—INDUSTRIAL DEPT. METROPOLITAN LIFE INSURANCE CO.

Age-period	White				Coloured			
	Male		Female		Male		Female	
	1922 to 1931	1911 to 1920	1922 to 1931	1911 to 1920	1922 to 1931	1911 to 1920	1922 to 1931	1911 to 1920
1 to 74 years	0.7	0.3	4.3	2.6	0.7	0.3	4.5	2.5
15 to 19	0.3	0.2	1.7	1.6	...	...	2.2	1.1
20 to 24	0.4	0.4	2.2	2.2	0.4	...	2.9	1.5
25 to 34	0.8	0.4	4.1	3.1	0.6	0.5	4.2	3.0
35 to 44	1.4	0.3	6.8	5.1	1.4	0.4	9.6	4.3
45 to 54	1.7	0.5	12.1	5.8	1.9	0.7	10.4	6.1
55 to 64	1.6	0.5	12.3	5.3	2.1	1.2	9.5	5.5
65 to 74	1.2	0.9	13.2	4.9	2.1	0.9	11.3	6.5

FRANK G. PEDLEY

**The Diminishing Menace of Tuberculosis.**

Statistical Bulletin, Metropolitan Life Insurance Company, 1932, 13: 1.

The past three decades have seen a striking change in the morbidity and mortality experience in civilized races. Many diseases have practically disappeared and others have diminished markedly. In the latter class falls tuberculosis, at one time a leader in the array of diseases and for many years referred to as "the captain of the men of death." The report, herewith reviewed, illustrates clearly the declining menace of tuberculosis in a somewhat novel manner. Since all men are mortal the probability of dying, in statistical parlance, is unity; but the probability of dying from some specified cause is only a fraction of unity, a fraction which varies, depending on the incidence and virulence of the specified disease. Among white males at birth, the probability of eventually dying from tuberculosis was 64.6 per 1000 in 1920; 50.9 per 1000 in 1925; and 42.5 per 1000 in 1930. Among white females at birth the probabilities were: 57.7 per 1000 in 1920; 44.4 per 1000 in 1925 and 35.6 per 1000 in 1930. Tables are given showing probabilities of dying from tuberculosis at different ages for males and females and for white and coloured persons. With respect to the latter, the probability is of course much higher—in fact more than double. A reduction has however occurred in this group.

FRANK G. PEDLEY

**The Effect of Cement Dust upon Workers.**

Russell, A. E., *Am. J. M. Sc.*, 1933, 185: 330.

The purpose of this investigation was primarily to measure in terms of physical condition and disabling sickness the effects upon the workers of exposure to known quantities of cement dust. The study was conducted throughout a period of nearly three years. The workers were examined twice during this period and where indicated special examinations and x-rays were made. If an employee remained away from work on account of illness the exact nature of the illness was ascertained.

In the mill where the investigation was conducted the air contained from 22 to 63 million particles per cubic foot of air. These particles were not larger than 10 micra. Chemical analysis showed that cement contains about 62 per cent lime and 22 per cent silica. Other constituents are alumina, iron oxide, magnesia and sulphur trioxide. Petrographic analysis showed that the proportion of free silica (quartz) varied from 6.5 per cent in the crusher-house to 1 per cent in the finished cement. The conclusions reached from a tabulation of the results showed that the frequency of respiratory diseases was twice as great as in non-dusty industries. Diseases of the skin gave a high rate of disability. Furunculosis was the cause of 70 per cent of the absences due to skin disease.

Conjunctivitis was the most frequent disability of the eyes. Of 570 workers examined, 21, or 3.7 per cent, were diagnosed as having pulmonary tuberculosis. In only 2 cases, however, was the disease active at the time of the first examination and each progressed as a result of the exposure to dust. Both had contracted the disease prior to their work in the dusty atmosphere. The other cases apparently had healed lesions and none showed activation during the period of observation.

E. S. MILLS

**Physiology and Biochemistry**

**Magnesium Deficiency in Animals.** Orent, E. R., Kruse, H. D. and McCollum, E. V., *Am. J. Physiol.*, 1932, 101: 454.

Young dogs were reared on a synthetic diet containing only 1.8 parts of magnesium per million. Within two weeks they show flushing of the nail-beds, tongue, buccal mucosa and finally of the ears; this is due to vasodilatation, without polycythemia. The phalanges begin to separate and the extremities become swollen and oedematous, so that most of the weight is borne upon the metatarsals and metacarpals, and the nails are distorted, become brittle, and break. There is great loss of hair, and the skin on the denuded areas becomes erythematous, desquamates, and eventually ulcerates. Lacrimation is profuse. After about one month there is nervous hyperexcitability; the animals, for no apparent cause, or in response to trivial stimuli, become restless, and finally collapse in convulsions of a characteristic type, tonic spasm being followed by clonic convulsions and finally a period of exhaustion in which many of the dogs succumb from cessation of respiration. The only notable changes in the blood chemistry are the progressive decline of the magnesium content, and a late rise in the cholesterol. Weight is usually maintained and appetite is not affected; the addition of pure magnesium salts to the diet prevents or cures the symptoms. The whole syndrome, which closely parallels that previously seen in rats, is regarded as a low-magnesium tetany, quite similar to low-calcium (*e.g.*, parathyroprivic) tetany, with certain characteristic symptoms, such as the presence of the vasodilatation and the absence of laryngismus and carpopedal spasm.

D. L. THOMSON

**Observations on Sensation: the Sensory Functions of the Skin for Touch and Pain.** Waterston, D., *J. Physiol.*, 1933, 77: 251.

Waterston presents new evidence from living human subjects that the receptor for light tactile sensation is in the deeper layers of the epidermis, that some of the cells of that layer are the receptors for touch, and that the nerves of the epidermis are specific tactile nerves. Delicate surgical operations were carried out on the thicker layers of the skin (such as the



front and sides of the terminal part of the fingers) of conscious human subjects, whereby the superficial layers of epidermis, including all of the stratum granulosum and some of the mucosum, were shaved off. It was found (1) that this operation was completely unattended by pain, thus ruling out the nerve fibrils, which were cut during the operation, from the category of pain nerves; (2) that touch sensations were experienced during the operation, and were the only sensations felt, thus indicating that these nerve filaments were concerned solely with tactile sense.

The presence of fine tortuous nerve fibres and terminal arborizations of extremely fine filaments around certain of the epithelial cells of the stratum mucosum was demonstrated by staining sections, cut from these shavings, with Ranvier's gold chloride. An oil-immersion lens was usually necessary for their optical demonstration. The surface of the denuded small areas of skin was pink in colour, and, upon stimulating it lightly, touch sensations were still experienced, doubtless by the intermediation of the residual and more deeply-lying tactile organs of the same type as those removed, but this sensation was modified and was described as "prickly", the alteration being doubtless due to the mutilated condition of the many cut filaments. Abandonment of the views that Pacinian and Meissner corpuscles mediate tactile sense and that intra-epithelial nerve filaments initiate pain sensations is indicated. The corium is regarded as the organ for the initiation of superficial pain.

C. C. MACKLIN

**The Biological and Clinical Importance of Ovary-stimulating Hormones.** Fluhmann, C. F., *Ann. Int. Med.*, 1932, 6: 1212.

The term 'ovary-stimulating hormone' is used for certain biological substances which determine the growth, maturity, and rupture of the graafian follicles and the development of corpora lutea. Associated with these anatomical changes is the elaboration of two ovarian hormones: (1) œstrin, which, in the human being produces growth of the endometrium, pelvic hyperæmia, and turgor of the uterus; and (2) progestin, which is responsible for the secretory changes found in the pre-gravid phase of the endometrium.

It is believed that there are two ovary-stimulating hormones, but the evidence is incomplete. They are found in the anterior hypophysis of men and women of all ages, and, during pregnancy in the human being are widely disseminated in the body of the mother and fetus. They have been demonstrated also in the blood and urine of patients following castration, and in the post-climacteric period. The evidence obtained to date favours the conception that the anterior lobe of the hypophysis is the main source of these hormones, but it is suggested

that "emmenin" (Collip) may be produced in the placenta. The author is doubtful, however, if emmenin can be included in the group of ovary-stimulating substances under discussion, because it does not produce histological changes in the ovaries of immature rats and is effective in young castrates.

From a clinical standpoint, three important advantages have resulted from the study of ovarian-stimulating hormones: (1) the development of an important test for the diagnosis of pregnancy and the control of the treatment of chorioepithelioma and hydatidiform mole; (2) the employment of a new method of approach for the study of certain endocrine conditions which are accompanied by ovarian disturbances; and (3) the use of extracts of ovary-stimulating hormones for the successful treatment of uterine hæmorrhages accompanying hyperplasia of the endometrium.

H. GODFREY BIRD

## Obituaries

**Dr. Michel-Delphis Brochu** died on March 12th at the age of 80, at the Hotel-Dieu du Précieux Sang, where he had undergone a surgical operation. Dr. Brochu had a long and distinguished medical career. Professor of the University of Laval, Quebec, he held three chairs, that of Hygiene, of Internal Pathology, and of Mental Diseases, and by the vigour and brilliance of his teaching infused a new life into all those in contact with him. The last thirty years of his life were devoted to the treatment and study of mental diseases. He was director of the Saint-Michel hospital until 1923.

He was born at St. Lazare de Bellechasse on July 5, 1853, and early in his education showed exceptional qualities for study. He graduated in medicine at the University of Laval, Quebec, in 1876, and continued to fulfill the brilliant promise of his early days. In 1884 the University of Laval appointed him to the chair of Hygiene, and four years later he went to Paris to carry out further studies under such teachers as Dieulafoy, Potain and others. He was only 37 when he was appointed to one of the most important chairs of medicine in the University of Laval, that of Internal Pathology, and here he began the teaching for which he became so well known. Honours and appointments followed fast, and there was hardly a post of honour in the medical profession which he did not fill in his turn. Perhaps the crowning scene of his career was the first congress of the Association des Médecins de Langue Française de l'Amerique du Nord in Quebec in June, 1902. One of the dreams of Dr. Brochu's life had been to unite the members of his profession in such an association. He was its first president and its success was due in no small measure to his initiative and inspiration.

**The Late Colonel Lorne Drum, C.B.E., B.A., M.D.** Colonel Drum's death occurred at St. Boniface Hospital, Winnipeg, on Saturday, April 15, 1933, as the result of a sudden acute illness which came on while in the train between Saskatoon and Winnipeg, where he was travelling in the execution of his duties for the Association by conducting a series of examinations for teams competing for the various St. John Ambulance Association Trophies.



Colonel Drum was born in Quebec City, July 25, 1871, and in 1911 married Frances, daughter of George B. Day, Montreal. He was educated at Boy's High School, Quebec; Bishop's College School, and McGill University, Montreal. Commissioned a Lieutenant in the Canadian Army Medical Corps in 1900, he saw service in South Africa at No. 10 Canadian Field Hospital. In 1905 he became a captain in the Permanent Army Medical Corps and at the outbreak of the Great War went overseas with the 1st Canadian Contingent as Officer Commanding No. 1 Canadian Stationary Hospital. He became Deputy Director of Medical Services, Canadians, London, 1915-16 and A.D.M.S. 5th Canadian Division, 1917. He became known to thousands of Canadians as Officer Commanding No. 3 Canadian General Hospital (McGill) at Boulogne, 1918, was brought to the notice of the Secretary of State for valuable services in connection with the Great War, 1917, and was mentioned in despatches. In 1925 he became a Colonel in the Royal Canadian Army Medical Corps. When he returned to Canada in 1920 he was named District Medical Officer of Military District No. 11 and was stationed at Esquimalt, where he remained 13 years. In 1933 he retired on pension, accepting the post of Director General of the St. John Ambulance Association in Canada, with headquarters at Ottawa. Colonel Drum is survived by his widow; one son, Ian, now attending Royal Military College, Kingston; a brother, Arthur W. Drum; and a sister, Mrs. H. F. Dyke, in British Columbia.

The news of Colonel Drum's death came as a severe shock, not only to the St. John Ambulance Association but also to the personnel of the Canadian Army, Navy and Air Force where he had been most intimately known for many years.

In connection with his sudden death it will be recalled that Colonel Drum nearly lost his life on active service when a hospital ship, on which he was Medical Officer, was torpedoed in the English Channel. He was rescued after he had been in the water several hours and the exposure caused a serious illness from which he never quite recovered.

Colonel Drum was buried beside his father and mother in Victoria, B.C., and a full military funeral service was carried out, the arrangements being made by the District Officer Commanding Military District No. 11, Esquimalt.

#### APPRECIATIONS

Mr. C. G. Cowan, President of the St. John Ambulance Association, gives expression to the following:

"Colonel Drum, who had for many years been lecturer and examiner in first aid, and served on the general executive of the British Columbia Council, was the logical successor to Colonel C. A. Hodgetts on his retirement in 1932 as Director General. In the short period of his service with the Association, he displayed qualities of initiative and splendid devotion to duty. The Association has sustained a great loss in his death so soon after taking office."

Colonel J. T. Clarke, the retiring Director General of Medical Services for Canada, writes as follows:

"I have known Colonel Drum intimately for 34 years and he was one of the most useful and efficient officers we ever had in the Medical Services. His work at all times was an inspiration to the junior officer and he was very popular with all ranks, not only in the Canadian Army Medical Corps but in all branches of the Service."

**Dr. Charles Hawkins Gilmour, 1879-1933.** It is with the deepest regret that we have to record that, early on the morning of Thursday, April 20, 1933, at his home in Toronto, Dr. Charles Hawkins Gilmour, passed to the Great Beyond.

He was the son of the late Dr. J. T. Gilmour, Warden of the old Central Prison and one of the continent's leading criminologists. He was born in Canton, Ont., on September 30, 1879, educated at the University of Toronto where he graduated in medicine in 1903. The following year he served as a house surgeon at Grace Hospital, thus beginning a connection which continued until his death. He practised in West Toronto from 1907 to 1914 and while there took a most active interest in the Canadian Army Medical Corps. He rose to the rank of Major and was O.C. of No. 11 Field Ambulance. In 1914, he went to England to do post-graduate work, taking the degrees of M.R.C.S. Eng. and L.R.C.P. Lond.

While engaged in this work, the Great War broke out and, with characteristic loyalty, he immediately offered his services to his country. He was accepted and assigned to No. 2 General Hospital. He went to France with the 1st Canadian Contingent early in 1915. For a year he was at Le Tréport in charge of a surgical service. His work was of such excellence he was mentioned in despatches. He was then recalled to England where he was attached to the Duchess of Connaught Hospital at Taplow. Later on he was in charge of surgery at the R.A.M.C. hospital at Bramshott. His services were recognized by his promotion to be a Lieutenant-Colonel and he was made Officer Commanding the active treatment hospital for Wounded Canadian Officers at Broadstairs. Owing to the frequency of air raids, it was found necessary to close this hospital and Colonel Gilmour was transferred to the Ontario Government Hospital at Orpington. His work here, particularly in brain surgery, attracted wide attention. On his return to Canada, in the summer of 1918, he was put in charge of surgery at St. Andrew's Military Hospital, and later on was sent to Halifax where he gave further valuable service to his country.

He was appointed senior surgeon at Grace Hospital, was consulting surgeon to St. Joseph's Hospital, and was chief surgeon for the Canadian National Railways in Toronto. He was honoured in being elected an F.R.C.S.(C.) and F.A.C.S. He was a most active member of the Academy, Chairman of Surgery, 1920-21, and served on the Council for several years. He was always a student and a frequent contributor to medical literature. He was a member of the Weston Golf and Country Club, the R.C.Y.C. and the Aesculapian Club. He attended Trinity United Church and was a member of the official board.

His early death at the height of his career is an irreparable loss to his family and his profession.

He is survived by his widow, Mrs. Edna Sayres Gilmour, two daughters, Mrs. Robert Sanderson and Miss Ruth Gilmour, and one granddaughter, Shirley Sanderson. He was a loving husband and father, a true patriot, a loyal friend and companion, and a brilliant, kind-hearted surgeon. He crowded much into his brief life, but the world is better because he lived.

HENRY C. WALES.

**Dr. Ernest Peltier**, Honorary Lieut.-Colonel of the Mount Royal Fusiliers, died on March 15th, at the age of 63, after a prolonged illness. Dr. Peltier was well known in medical and military circles. He was born in Montreal in 1870, and graduated from the University of Laval, Montreal, in 1896. In 1900 he went to France and studied for three years, took up practice on his return and soon acquired a wide reputation as a specialist. He was also greatly interested in military affairs, and early in his career entered the 65th Regiment as a private. Six years ago he gave up his activities on account of illness and was then made Hon. Lieut.-Colonel of the Fusiliers.

**Dr. George David Stewart**, a native of Cumberland County, N.S., who lived to become one of the leading surgeons of the United States, died at his home here recently. He celebrated his 70th birthday last December. Dr. Stewart was a former president of the New York Academy of Medicine and the American College of Surgeons, and he had held many other positions in important groups organized by medical men. He did his greatest work, however, as head of the Department of Surgery at New York University and Bellevue Hospital Medical College, where his abilities in training young surgeons led the late George F. Baker to give \$1,000,000 to New York University in 1929 to found the George David Stewart endowment for surgery.

**Dr. Holford Walker**, student of prophecy, has pre-deceased the Armageddon which he repeatedly predicted. The 87-year-old physician who practised medicine in Ontario for 60 years, who founded two hospitals and who, through 45 years study of hieroglyphics on pyramids, had reached the firm conviction that the world would end before 1936, died last week and was buried at Dundas.

So sure was Dr. Walker in June of 1927, that the Pons-Winnecke comet was a divine manifestation of the approach of Armageddon that he arranged for the disposition of his worldly possessions, caused his pet Airedale dog to be destroyed by the Humane Society and calmly prepared for the end of the world.

Dr. Walker was born in Barrie, graduated from Queen's Medical School in 1867, and took a post-graduate course in London. Returning to Canada he commenced practice in Dundas, where he remained for 21 years. Then he moved to Toronto, where he was instrumental in establishing a small hospital. After many years practise here he retired, and in the comforts of a Grosvenor street apartment, devoted himself to the study of prophecy and particularly the messages inscribed on the pyramids.

It was in June, 1927, that he forecast the beginning of an eight-year period of tribulation that would conclude with the world's doom. Because he thought conditions would be deplorable as to require great need of welfare agencies he altered his will disposing of what was said to be a large estate. It was to be divided among a number of hospitals, and none of his relatives was included, for, Dr. Walker explained, they would be "of the elect" and would require no worldly goods.

## News Items

### Great Britain

**A Lower Birth Rate.**—The Registrar-General's provisional figures for the year 1932, giving birth rates, death rates and infant mortality for England and Wales, show that for the fourth year in succession the birth rate for England and Wales of 15.3 per 1,000 of the population is the lowest on record, being 1.0 per 1,000 below that of 1929 and 1930 and 0.5 below that of 1931. The death rate of 12 per 1,000 of the population is 0.3 below that for 1931. The infant mortality rate is 1 per 1,000 below that for 1931. The only year showing a lower rate is 1930. In 1928 the rate was the same—namely, 65.

**Royal Society of Edinburgh.**—A David Anderson-Berry Gold Medal, together with a sum of money amounting to about £100, will be awarded in July, 1935, by the Royal Society of Edinburgh to the person who,

in the opinion of the Council, has recently produced the best work on the nature of x-rays in their therapeutic effect on human diseases. A further notice will be published early in 1935. A similar award will be made every three years.

### Alberta

The special Commission appointed by the Provincial Legislature in 1932, to make recommendations on health insurance during the present session of the legislature, has requested that their report be received, and that the task of this commission be allowed to continue until the final report shall be presented. The results of their investigations so far are as follows:— (1) Adequate medical services for all the people of Alberta can only be secured through the operation of a contributory health insurance scheme. Such a scheme would result in the carrying out of the intention of the resolution. (2) An ideal scheme should be presented as the ultimate objective of this province; any scheme of a more local nature should be so planned as to be readily adaptable to a broad general scheme, which might be province-wide, or eventually, Dominion-wide in its scope and application. (3) Existing legislation whereby municipal districts or parts thereof may organize for the provision of medical and allied services should be utilized.

A complete service should include:— (a) The regular general practitioner service of general medicine, minor surgery, obstetrics, etc. (b) Specialized service, special diagnostic services and major surgery. (c) Hospital care and hospital facilities, such as pathological laboratory services, roentgen ray services, etc. (d) Dental services. (e) Prescribed medicines, prescribed surgical appliances, etc. (f) A preventive medical service, that is a public health service similar to that now available in the larger urban centres, such as Edmonton and Calgary, and in the rural districts, such as High River and Red Deer.

The Commission recommends that the members of the Legislature should study the alternative plans:— (1) the "Contract Salary" which is the only feasible one in more remote areas and sparsely populated districts; and (2) the "Payment for services rendered" plan, which would permit the patient to choose his doctor, whose services should be compensated at the rates similar to those of the Workmen's Compensation Board. In setting fees, the committee favours an adjusted schedule, providing a more equitable ratio between the fees for medical services, and those for surgical services, and between fees for general and specialized services. Fees at present for surgical and specialized services are in the opinion of the Commission too high. The estimated cost for the complete services is rated at \$12.29 per capita, or \$8,995,678.00 for the province annually.

During the period since the Sterilization Act came into effect in Alberta in 1928, there have been 156 sterilizing operations performed (35 male and 12 female). Fifty-six of these were performed at the Mental Hospital at Ponoka, 42 at the Training school at Red Deer, and 56 in Edmonton, Calgary and Lethbridge. All such patients are examined and sanctioned given by a special Eugenics Board of four members, to each of whom an honorarium of \$350.00 is given. The fees of the surgeons for the series of cases enumerated were \$8,900.00. The hospital expenses of the patients amounted to \$7,400.00.

According to the Alberta Pharmaceutical Act, any physician who registered in this province prior to March, 1918, may, on application and on payment of the necessary fee, become a registered pharmacist and as such may practise as a druggist and may advertise. All physicians may prescribe and dispense drugs, but may not fill prescriptions written by other physicians, nor may they sell poisons to other than their own patients.



According to an Amendment to the Pharmaceutical Act, now before the Alberta Legislature, no restrictions will be placed on physicians or others in regard to the selling of poisonous drugs, provided that they do so at least fifteen miles from the nearest place operated by a member of the Pharmaceutical Association, and conform to the regulations contained in the Act in reference thereto.

Members of the Medical Department of the University of Alberta will give a post-graduate "Refresher Course," commencing May 29 and extending to June 2, 1933. A nominal charge of \$5.00 will be made. The fees will be applied to expenses. The course will be divided into a medical and a surgical section, though each morning there will be a combined clinico-pathological conference. There will be daily ward rounds. During the course there will be symposia on appendicitis, fractures of the upper extremity, the early diagnosis of cancer, fractures of the lower extremity, post-operative care and back-pain. It is expected that there will be a larger attendance this year than last when a similar course was given.

Dr. Heber Jamieson of the University Hospital, Edmonton addressed the members of the Calgary Medical Society on March 7, 1933, on the subject of "Diabetes". Three theories pertaining to the etiology of diabetes were reviewed at some length:— (1) the insular; (2) the counter-regulations; and (3) the pluriglandular. A general survey was made of the results of treatment of diabetes in this province from ascertained statistics, over a period of twelve years, which covered the period that insulin has been used as a therapeutic agent in this disease. By means of charts which demonstrated the mortality incidence during this period, it was evident that while the death rate from diabetic coma had been less, yet, there was no apparent reduction of other complications. Nevertheless, the length of life has been increased. With more efficient treatment still better results should be obtained in this province.

Dr. W. H. Hill, D.P.H., of Edmonton, has succeeded Dr. David Gow as medical officer of health of the City of Calgary and Superintendent of this city's municipal hospitals. He is a graduate of Alberta, of McGill and of Liverpool Universities. He obtained his D.P.H. from Toronto University in 1931.

The town of Ponoka and the municipality of Wainwright have entered into hospital contracts for the care of the indigent sick. The former with the Edmonton General Hospital at a daily rate of \$1.75, and the latter with the Wainwright Municipal Hospital at the rate of \$6.00 on admission for each patient, and in addition \$1.00 for each hospital day.

G. E. LEARMONTH

### British Columbia

A committee of the Vancouver Medical Association, which has been studying the question of the provision of medical care of the recipients of relief, has recently recommended that the outdoor department of the Vancouver General Hospital be closed to all cases except those referred by a physician for special consultation or treatment. Action has resulted from the fact that under the present policy the authorities pay for all supplies and services rendered to relief cases, with the exception of medical care. A resolution to the above effect was recently adopted by the Vancouver Medical Association, and a similar recommendation was forwarded by the medical board of the hospital to the hospital directorate.

On May 2nd, thirty-seven graduates of St. Paul's Hospital, in Vancouver, received their diplomas.

The Graduate Nurses' Association has revised the rates for private nursing, on the basis of a reduced fee per day, with an eight hour day, in place of the former twelve hour day. It is hoped to bring nursing care within the financial reach of more patients, and at the same time to provide work for more nurses.

C. H. BASTIN

### Manitoba

On April 15th the Out-patient Department of the Winnipeg General Hospital, which had been in operation for twenty-eight years, closed on account of lack of funds. Financial stringency has caused a marked reduction of paying patients and an increase of non-paying patients. While economies were effected wherever possible the reductions obtained in this way did not compensate for the loss of revenue. The task of the hospitals in the province was made heavier by a reduction of 25c. per day in the amount paid by municipalities for patients for whom the municipality was liable, and a reduction of 10c. per day from the provincial government. It is estimated that a saving of \$40,000 can be effected by the closing of the Out-patient Department. The trustees of the hospital have appealed to the city council for aid which would enable the out-patient department to be carried on but, so far, the appeal has fallen on deaf ears.

In the Manitoba Notes for April it was stated that a plan had been submitted to the Council of Winnipeg by the committee of doctors from the Manitoba Medical Association and the Winnipeg Medical Society to deal with the problems of payment for medical service to those who are in receipt of relief. This plan was submitted at the request of members of the Council who had met with the executive of the committee. Although more than two months have elapsed the plan has apparently not been discussed by the council.

Owing to the necessity for retrenchment the Minister of Health and Public Welfare of Manitoba has decided to dispense with the services of the Provincial Epidemiologist.

The week of April 23-29 has been Diphtheria Prevention Week. The Department of Health and Public Welfare has urged through press and pulpit the importance of having children inoculated with toxoid in an attempt to stamp out diphtheria.

ROSS MITCHELL

### New Brunswick

The local committee of arrangements for the meeting of the Canadian Medical Association in Saint John, this year, has progressed to a point where it is assured that an excellent programme will be available for our visitors. If you have not already done so, now is the time to make up your mind to come down east to this annual meeting. The trip will be enjoyable, the country worth seeing and you may rest assured that everything possible will be done to provide you interesting entertainment.

New Brunswick and Saint John invite all the members of the Canadian Medical Association to be with them in our annual get-together.

Dr. R. W. L. Earle of Perth underwent an operation, recently, in the Montreal General Hospital. Reports indicate that the operation was successful and the Doctor's convalescence is satisfactory.

At the annual meeting of the Saint John Medical Society, held in April, Dr. Joseph Tanzman was elected President for 1933-34, succeeding Dr. O. B. Evans. Other officers elected were: vice-president, Dr. J. P.



McInerney; Secretary, Dr. W. J. Baxter; Treasurer, Dr. F. C. Jennings. At this meeting, Dr. R. A. Hughes spoke on diseases of the middle ear, emphasis being laid on correlation of treatment as between the general practitioner and the specialist. Dr. Hughes reviewed a considerable series of middle ear infections and mastoid operations that have been presented during the last winter season. The meeting was largely attended and the discussion of this paper was animated.

Dr. Clarence J. Veniot was elected mayor of Bathurst at the civic election in April. Dr. Veniot was elected without opposition. Another medical practitioner, Dr. Alphonse Sormany, was elected mayor of Shediac.

Dr. A. W. Ross is moving from Saint John where he has been associated in practice with Dr. W. F. Roberts to Souris, P.E.I. A. STANLEY KIRKLAND

### Nova Scotia

The Executive of the Nova Scotia and Prince Edward Island Hospital Association, at a meeting held in Halifax recently, passed a resolution that the legalization of hospital sweepstakes would be detrimental to Nova Scotia hospitals. It was further decided to hold the annual meeting of the Association at St. Martha's Hospital, Antigonish, on the last Tuesday and Wednesday in June. Several prominent speakers have been invited to attend the meeting. Among these are Dr. M. MacEachern, of the American College of Surgeons, Dr. G. Harvey Agnew, of Toronto, and Dr. S. R. D. Hewitt. Dr. H. L. Scammell was elected to represent the Association at the meeting of the New Brunswick Association in June. The meeting also went on record to the effect that Nova Scotia was adequately provided with hospitals, and that the erection of new hospitals should not be sanctioned unless an urgent need existed.

Considerable interest was aroused in the province by transportation of a case of leprosy from Toronto to the hospital at Tracadie, New Brunswick. The car in which the patient travelled had been sent into Nova Scotia and local health authorities expressed some alarm, but assurance came from the manager of the railway concerned that the car had been properly fumigated, and from the Minister of Health on the low infectivity of leprosy.

The Immunization Clinic at Dalhousie University Public Health Centre is going ahead with its immunization work against diphtheria, and since its opening at the beginning of the year over 1,000 visits have been made to the clinic. It is a healthy sign that the importance of preventive medicine is being recognized by the public.

Dr. A. Greig, head of the Medical Division of the Rockefeller Foundation, paid a two-day visit to the Medical School at Dalhousie University. During his stay he made a thorough inspection of the different departments of the Medical School. His visit was much appreciated by the University authorities.

N. B. DREYER

### Ontario

The Toronto Hospital for Incurables has added a new solarium to their building at a cost of \$4,000.

The Parkwood Hospital, London, Ont., has planned a two-storey addition at a cost of \$50,000, to be erected as soon as the Dominion Government has approved the plans.

The Honourable Dr. J. M. Robb, Minister of Health for Ontario, announced before the close of the Legislature that, in keeping with the Government policy of economy, all annual grants to hospitals will be reduced

from 10 to 15 per cent. He further announced the municipal liability for patients in the Hospital for Incurables will be reduced from \$1.75 a day to \$1.50 a day; and that the municipal liability for babies born in hospital will be reduced from 90c. a day to 60c.

The Registered Nurses' Association of Ontario held its annual meeting at the Prince Edward Hotel, Windsor, April 20th and 21st, 1933.

The proposed amendment to the Medical Act, which attempted to bring legally qualified osteopaths under the Medical Act, so that they would have the same status as medical doctors, was killed by the Legal Bills Committee of the Legislature last month. A Committee was appointed to study the matter. The Committee includes the Honourable Charles McCrea, Honourable Dr. J. M. Robb, A. R. Nesbitt (Conservative, Bracondale), who sponsored the Bill; T. K. Slack (Progressive, Dufferin); Argue Martin (Conservative West Hamilton); and W. A. Baird (Conservative, High Park). The Committee will probably report at the next meeting of the Legislature.

At a recent meeting of the Oxford County Medical Society, Dr. C. S. Tennant, Superintendent of the Ontario Hospital, Woodstock, was elected president and Dr. H. Baker of Woodstock, secretary-treasurer.

A summary of the out-patient attendances at the hospitals of Toronto has been prepared by the Statistical Division of the Department of Public Health, Toronto; the summary includes attendances at the special clinics—orthopaedic, chest, eye, ear, nose and throat, heart, skin, neurological, genito-urinary, venereal, physiotherapy, etc., in addition to the large medical and surgical clinics.

Grace .....	26,032
Hospital for Sick Children.....	58,596
Salvation Army Welfare Hospital....	1,597
St. John's .....	9,159
St. Joseph's .....	5,162
St. Michael's .....	100,834
Toronto East General .....	8,290
Toronto General .....	112,501
Toronto Psychiatric .....	843
Toronto Western .....	73,180
Women's College .....	14,054
Toronto Orthopaedic .....	120

Total ..... 440,368

J. H. ELLIOTT

### Saskatchewan

At a meeting of the Saskatchewan Hospital Association Dr. V. E. Black, of Moose Jaw, gave an address entitled "A medical staff viewpoint of institution co-operation." He said in part: No board member can be of much value to the hospital for at least two years after appointment. As seen from the viewpoint of the staff the Board of Governors should be more or less permanent; it is the ideal thing for a business man without a hobby. The hospital superintendent should have freedom of action; if he does not make good discharge him; but after the Board has formulated a policy they should let him carry out his own work as the directors of any other institution would let a manager carry out a policy. The superintendent should cooperate with the staff in organizing a follow-up system. Large hospitals have these, but small hospitals can have them in miniature. Follow-up letters would make and keep fast friends for both doctor and hospital, as well as help to check up the results of treatment.

The major object of the superintendent of nurses is to obtain the best possible care of the patient and her minor object is to equip young women to become trained nurses. In smaller hospitals where the eight-

hour nursing system does not exist there is danger of breaking the nurse physically, or of asking her to carry on nursing duty when fatigue from the work of lectures and study have rendered her unfit to give good nursing service. The staff must remember that their responsibility to the nurse in training continues from her acceptance to her graduation and after. They owe it to her to teach her on duty as well as at lectures, to point out with kindness and consideration her mistakes, to give her little pointers of value, to watch her health through periodic health examinations. The staff man should be an example of economy to the nurse in training; how many staff men are as careful in the use of hospital supplies as they are of their own?

The Board and staff often eye one another with suspicion; the Board often thinks that the doctor only considers his own convenience, thinks that the hospital is built for him, is constantly asking for things not absolutely necessary, keeps non-paying patients there longer than he should, rather than make non-paying calls outside, is wasteful of supplies. Sometimes the Board is right. The staff on the other hand are having a hard time to keep up with newer hospital procedures and new forms of treatment. They think that frequently changing Boards composed of men with a dozen other interests can know very little of hospital management; that they think mostly in terms of dollars and cents instead of in terms of lives and health; that they try to make the hospital self-supporting, a thing it can never be. Sometimes the staff is right.

Once or twice a year the Board and Staff should meet, not to scratch one another's backs but to listen to one or two thoughtful speeches by members of both groups.

The average stay of private and semi-private cases in the Moose Jaw Hospital last year was 9.6 days, the average time for public cases 17.9 days. The Board and the Staff should urge the cities to provide board and lodging for the sick indigent who do not need hospitalization.

Notice of motion has been given to the Chancellor and members of the Senate of the University of Saskatchewan by Dr. T. A. Patrick that at the next meeting he would move that the attention of the government of Saskatchewan be called to the fact that part of the Drugless Practitioners' Act which provides that "A Drugless Practitioner may use the word 'Doctor' if used in conjunction with other words indicating that his profession is osteopathy or chiropractic, is in derogation of the powers given to this University by the University Act; and should be struck out.

Section 44 of Chapter 179 of Revised Statutes of Saskatchewan, 1930, Vol. III, says, "No drugless practitioner shall use to designate his profession or calling, words or letters usually used to designate members of the College of Physicians and Surgeons; provided that a drugless practitioner may use the word 'Doctor' the contractions thereof 'Dr.' and 'D', or the word 'physician' if used in conjunction with another word or other words or contraction or contractions thereof indicating that his profession is osteopathy or chiropractic, or as the case may be."

Dr. Patrick pointed out that no objection is taken to the Act itself, which being a matter of public policy is a matter with which the University has nothing to do, other than discharge such duties as the Legislature imposes on it; nor is any objection taken to the use of the word "physician" in that connection, however incongruous its use by a drugless practitioner may appear. It is a word not used as conferring any degree by any University.

In 1932 the ten Red Cross Outposts cared for 496 maternity cases. There were two maternal deaths. One of them was admitted with influenza and died on the fourth day after confinement, and the other was admitted three months pregnant; the fetus was dead,

there had been no prenatal care, and the mother died of hæmorrhage.

Dr. T. A. Patrick, who has practised medicine in the West for forty-four years, was presented with an illuminated address at the thirty-fifth annual banquet of the Yorkton District Board of Trade. Dr. Patrick is intimately acquainted with the hardships of pioneer life. His friends, in presenting the address, said that he had never been known to spare himself when called upon to minister to the sick. The roads in the early days were mere trails and Dr. Patrick's buckboard and bronchos were familiar to all residents of a wide area. The address mentioned him as a far-sighted, public spirited citizen with reference to his devotion to duty, his service as a member of the Legislative Assembly of the Northwest Territories, his pioneer efforts toward beautifying Yorkton, his interest in all matters pertaining to education and in the work of the Board of Trade.

LILLIAN A. CHASE

### United States

Dr. Foster Kennedy has been appointed Consulting Neurologist to the New York Polyclinic Medical School and Hospital.

Dr. Joseph E. J. King has been appointed Clinical Professor in the Department of Neuro-Surgery at the New York Polyclinic Medical School and Hospital.

**The 1933 Graduate Fortnight of the New York Academy of Medicine.**—Metabolic Disorders will be the theme of the 1933 Graduate Fortnight of the New York Academy of Medicine. Two weeks of intensive study, from October 23 to November 3 inclusive, will be devoted to this important branch of medical science. The theoretical, physiologic and pathologic phases of metabolism, as well as of certain of the associated endocrinologic problems will be treated in a series of round table discussions and clinical demonstrations. The latter will be given in fifteen of the leading hospitals of New York City.

An exhibit will be shown in connection with the Fortnight, material having been collected from many institutions in Metropolitan New York. The various aspects of metabolic disorders will be covered in this exhibition including the history of metabolism; dietary constituents and their derivatives; drug and other therapeutic measures; general and special pathological metabolism; and laboratory methods and procedures. The subjects will be illustrated by means of charts, graphs, photographs, microphotographs, transparencies, x-rays, gross and pathologic specimens. A complete program and registration blank may be secured by addressing Dr. Frederick P. Reynolds, The New York Academy of Medicine, 2 East 103rd Street, New York City.

Dr. Russell L. Cecil has been appointed Professor in the Department of Internal Medicine, and Attending Physician to the New York Polyclinic Medical School and Hospital.

**The American College of Physicians** will hold its Eighteenth Annual Clinical Session in Chicago, with headquarters at the Palmer House, April 16-20, 1934.

Dr. George Morris Piersol, of Philadelphia, is President of the American College of Physicians, and will arrange the Program of General Sessions. Dr. James B. Herrick, Emeritus Professor of Medicine of Rush Medical College, Chicago, has been appointed General Chairman of local arrangements and will be in charge of the Program of Clinics. Mr. E. R. Loveland, Executive Secretary, 133-135 S. 36th Street, Philadelphia, Pa., is in charge of general and business arrangements, and may be addressed concerning any feature of the forthcoming Session.



### General

**The First French Congress of Therapeutics** will be held at Paris on October 23rd to 26th, under the presidency of Professor Loeper, president of the Therapeutical Society. Reports will be presented at that meeting on the following subjects: Parenteral treatment of gastric ulcer; the treatment of infection with colon bacillus; the adrenals, short waves in treatment; the treatment of lesions of the skin due to radium.

All information can be obtained from Dr. G. Doin, treasurer of the Congress, 8 Place de l'Odéon, Paris, 6e.

**Scholarships at the "Benito Mussolini" Institute in Rome.**—Governments and National Societies belonging to the Union are reminded that the Italian Fascist National Federation against Tuberculosis places at the disposal of the International Union against Tuberculosis two scholarships at the Benito Mussolini Institute in Rome.

The conditions are as follows: These competitive scholarships, of a value of 6,000 liras respectively, plus board and lodging, are intended to enable foreign medical practitioners to stay at the Benito Mussolini Institute in Rome for the purpose of following a course of studies. This period of eight months will correspond with the academic year (from November 15th to July 15th), namely eight months interrupted by the usual holiday periods. The scholars shall reside at the Institute.

The scholarships shall preferably be awarded to young physicians who are already familiar with tuberculosis problems and who wish to improve their knowledge of this branch of medicine.

The kind of work undertaken at the Institute will be subject to an agreement between the Director of the Institute and the candidate.

The publication expenses resulting from this work may be defrayed partly or entirely by the Institute.

The scholarships will be awarded at the summer session of the Executive Committee, which will meet this year in July. The names of candidates, accompanied by particulars as to their age, qualifications and professional experience, must be forwarded to the Secretariat of the Union, 66 Boulevard Saint-Michel, Paris, not later than July 1, 1933.

**Medical Work in Berlin.**—Medical men would do well to apply to the Medizinische Informationsbüro (Medical Enquiry Office) at the Kaiserin-Friedrich Haus, Berlin N.W. 7, Robert Koch-Platz 7. Any information of interest to the medical man, concerning hospitals, clinics, public health matters, continuation courses, etc., will be obtainable there. The enquiry office is of a semi-public nature, all information being furnished impartially and gratuitously. The medical man visiting Berlin will benefit from his stay to a far greater extent if he communicates with the office either previously or immediately after his arrival.

**Bibliographical Collection of Medical Sciences, via Farini N. 6, Bologna (Italy).**—Since 1924 a Bibliographical Collection of Medical Sciences has been in existence in Bologna. In this collection words are distributed and classified as in a dictionary. The words contained number more than four millions. By means of this collection students who want to write a scientific article can learn of every thing that has been written on the subject they study. The bibliographical references to essays and original works which have been published in periodical reviews in every part of the world are daily classified, collected and distributed as in a dictionary.

This bibliographical collection is of the greatest use to students, as is proved by the daily requests for literature received from Italy and from abroad.

Students may, too, subscribe to the specific parts in which they are interested. In this case bibliographical information can be periodically supplied. The collec-

tion is organized by a body of specialized physicians and questions are answered with great promptness. (We understand that this service is at the disposal of our subscribers. [Ed.])

**A Doctor at "Farthest North."**—Up in the farthest north where mail planes roar over slow-moving parka-clad mushers and their husky dogs, one doctor is introducing modern medical methods among the Eskimos and Indians with great success.

It was in 1928 when Dr. James Urquhart, a graduate of McGill University, responded to an appeal for some doctor to serve in the Arctic when an influenza epidemic was threatening to wipe out a large proportion of the northern population. Employed by the Canadian Federal Government, Dr. Urquhart's "beat" now covers 90,000 square miles, from Arctic Red River to Herschel Island and from Aklavik to Cambridge Bay.

According to Dr. Urquhart the infant mortality rate among Eskimos has been reduced enormously since the introduction of modern medical methods. For a time the Eskimo mothers regarded the new white doctor with suspicion, but now they will "mush" hundreds of miles with dog teams to have their babies born in one of the two mission hospitals at Aklavik.

Health standards among the northern people are higher than generally believed, and the principal complaint is diseases of the stomach, Dr. Urquhart said.

This is largely due to the fact that Eskimos and Indians do not know the meaning of the word "diet."

Three Eskimo witch doctors in Dr. Urquhart's territory made trouble at first. Dr. Urquhart says he dealt with these "firmly", and they haven't made trouble since. Eskimos have a wholesome respect for the great white lord-king who, from his golden throne far across the sea, can send his scarlet-coated police to see that his commands are obeyed.

By boat in summer and dog team or airplane in winter, Dr. Urquhart makes frequent long trips from his headquarters at Aklavik. Aklavik, "metropolis of the north," near the mouth of the mighty MacKenzie River, boasts two well equipped hospitals in the Anglican and Roman Catholic missions, eight white families and several hundred Eskimos and Indians. Dr. Urquhart is superintendent of both hospitals and performs many operations every year. At the Anglican mission is a modern x-ray machine, installed a few months ago.—*Toronto Telegram*, Jan. 24, 1933.

**Colonel J. T. Clarke, C.B.E., M.C., M.D.**, has been appointed acting Director-General of the St. John Ambulance Association in the room of the late Colonel Drum.

**The National Tuberculosis Association.**—The twenty-ninth Annual Meeting of this Association will take place at Toronto from June 26th to 30th.

### Book Reviews

**Diabetes Mellitus.** I. M. Rabinowitch, D.Sc., M.D., C.M., F.R.C.P.(C.), Assistant Professor of Medicine and Lecturer in Biochemistry, McGill University. Introduction by A. B. Macallum, M.A., M.B., Ph.D., D.Sc., LL.D., F.R.S. Price \$3.50. Macmillan Co., Toronto, 1933.

Dr. Rabinowitch has written this book on diabetes for practitioners and medical students. It presents in a concise, readable and simplified form the underlying principles of a rational treatment which experience has taught him to be most efficient. It outlines the diagnosis and management of diabetes in such a way that the practising physician can treat his diabetics successfully without an elaborate laboratory.

Dr. Rabinowitch aims to keep his diabetics at their daily occupation by giving them as normal a diet as is



possible. He emphasizes the use of a high-carbohydrate, low-calorie diet, and has thus pioneered a new and happier era for diabetics. This book is sane and comprehensive and can be highly recommended as one of the most worthwhile on the subject of diabetes.

F. G. BANTING

**Accommodation in the Human Eye.** A Thesis by R. A. Yeld, M.D. 55 pages, illustrated. Privately printed. Copies may be obtained from the author, Edgewood, B.C.

The thesis is divided in four sections, Anatomical, with bibliography; Physiological; Changes taking place in the eye during accommodation, and; Summary and additional notes, with bibliography. An attempt is made to harmonize where possible the opinions of many writers on the mechanism of accommodation and as an introduction the necessary anatomical details are pointed out.

In the Physiological Section the author deals first with Gullstrand on the Lens in Accommodation; and secondly, the views on the Hydraulic Theory of Accommodation (extrinsic) (in favour and against), are given.

In Part III, the changes taking place in the eye during accommodation are taken up, first dealing with extrinsic changes in accommodation under the following headings: The Ciliary Muscle, The Zonule, The Ciliary Processes, The Circum-lental Space, The Aqueous Humour, The Iris, The Vitreous Humour. The Intrinsic or Lenticular Changes in Accommodation are then dealt with under the heading of The Capsule, and Changes in the Lens. The views of Tscherning, Helmholtz, Fincham, Duane, Luedde, and Gullstrand are given and commented upon by Yeld, who regards accommodation as effected by the action of the ciliary muscle upon the lens in association with a variable degree of zonular relaxation, with a limited amount of external hydraulic pressure. There is an asymmetric action of the ciliary diaphragm varying with the position of the head so that the uppermost zonular fibres are less relaxed than the others in the circle. The intrinsic changes in the lens are brought about by relaxation of its capsule so that it becomes thicker along its axis with a reduction in its circumference and an increase of refractive index. The vital elasticity of the lens substance, though postulated by Helmholtz, has not in Yeld's opinion been actually proved or disproved in any detailed work published in the English language. Gullstrand and Kronfeld deny elasticity, and it is apparently not essential to the theory. A relative flattening of the margin of the lens, both in front and behind, which is due to the thickness and adherence of the capsule in the region of the equator has also a part in the mechanism of accommodation.

**Chronic Arthritis and Fibrositis, Diagnosis and Treatment.** Bernard Langdon Wyatt, M.D., F.A.C.P., Director of the Wyatt Clinic, Tucson, Arizona. 198 pages, illustrated. Price \$3.50. William Wood & Co., Baltimore, 1933.

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lumbago, muscular rheumatism, etc.). There are good x-ray reproductions and microscopic sections. Early diagnosis is emphasized as important to a cure, as the commonest type, proliferative arthritis, is prone to result in ankylosis. It is pointed out that in the degenerative type removal of foci of infection only exceptionally does good, while in the proliferative type such treatment is usually of great benefit. On the other hand 43 per cent of recoveries may take place in the presence of infective foci (Cecil and Wyatt). Diets, electrotherapy, massage, hydro-therapy and colonic irrigation are treated most exhaustively. Vaccines, and particularly surgery, are apparently not greatly in favour.

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### General

**The First French Congress of Therapeutics** will be held at Paris on October 23rd to 26th, under the presidency of Professor Loeper, president of the Therapeutical Society. Reports will be presented at that meeting on the following subjects: Parenteral treatment of gastric ulcer; the treatment of infection with colon bacillus; the adrenalines, short waves in treatment; the treatment of lesions of the skin due to radium.

All information can be obtained from Dr. G. Doin, treasurer of the Congress, 8 Place de l'Odéon, Paris, 6e.

**Scholarships at the "Benito Mussolini" Institute in Rome.**—Governments and National Societies belonging to the Union are reminded that the Italian Fascist National Federation against Tuberculosis places at the disposal of the International Union against Tuberculosis two scholarships at the Benito Mussolini Institute in Rome.

The conditions are as follows: These competitive scholarships, of a value of 6,000 liras respectively, plus board and lodging, are intended to enable foreign medical practitioners to stay at the Benito Mussolini Institute in Rome for the purpose of following a course of studies. This period of eight months will correspond with the academic year (from November 15th to July 15th), namely eight months interrupted by the usual holiday periods. The scholars shall reside at the Institute.

The scholarships shall preferably be awarded to young physicians who are already familiar with tuberculosis problems and who wish to improve their knowledge of this branch of medicine.

The kind of work undertaken at the Institute will be subject to an agreement between the Director of the Institute and the candidate.

The publication expenses resulting from this work may be defrayed partly or entirely by the Institute.

The scholarships will be awarded at the summer session of the Executive Committee, which will meet this year in July. The names of candidates, accompanied by particulars as to their age, qualifications and professional experience, must be forwarded to the Secretariate of the Union, 66 Boulevard Saint-Michel, Paris, not later than July 1, 1933.

**Medical Work in Berlin.**—Medical men would do well to apply to the Medizinische Informationsbüro (Medical Enquiry Office) at the Kaiserin-Friedrich Haus, Berlin N.W. 7, Robert Koch-Platz 7. Any information of interest to the medical man, concerning hospitals, clinics, public health matters, continuation courses, etc., will be obtainable there. The enquiry office is of a semi-public nature, all information being furnished impartially and gratuitously. The medical man visiting Berlin will benefit from his stay to a far greater extent if he communicates with the office either previously or immediately after his arrival.

**Bibliographical Collection of Medical Sciences, via Farini N. 6, Bologna (Italy).**—Since 1924 a Bibliographical Collection of Medical Sciences has been in existence in Bologna. In this collection words are distributed and classified as in a dictionary. The words contained number more than four millions. By means of this collection students who want to write a scientific article can learn of every thing that has been written on the subject they study. The bibliographical references to essays and original works which have been published in periodical reviews in every part of the world are daily classified, collected and distributed as in a dictionary.

This bibliographical collection is of the greatest use to students, as is proved by the daily requests for literature received from Italy and from abroad.

Students may, too, subscribe to the specific parts in which they are interested. In this case bibliographical information can be periodically supplied. The collec-

tion is organized by a body of specialized physicians and questions are answered with great promptness. (We understand that this service is at the disposal of our subscribers. [Ed.] )

**A Doctor at "Farthest North."**—Up in the farthest north where mail planes roar over slow-moving parka-clad mushers and their husky dogs, one doctor is introducing modern medical methods among the Eskimos and Indians with great success.

It was in 1928 when Dr. James Urquhart, a graduate of McGill University, responded to an appeal for some doctor to serve in the Arctic when an influenza epidemic was threatening to wipe out a large proportion of the northern population. Employed by the Canadian Federal Government, Dr. Urquhart's "beat" now covers 90,000 square miles, from Arctic Red River to Herschel Island and from Aklavik to Cambridge Bay.

According to Dr. Urquhart the infant mortality rate among Eskimos has been reduced enormously since the introduction of modern medical methods. For a time the Eskimo mothers regarded the new white doctor with suspicion, but now they will "mush" hundreds of miles with dog teams to have their babies born in one of the two mission hospitals at Aklavik.

Health standards among the northern people are higher than generally believed, and the principal complaint is diseases of the stomach, Dr. Urquhart said.

This is largely due to the fact that Eskimos and Indians do not know the meaning of the word "diet."

Three Eskimo witch doctors in Dr. Urquhart's territory made trouble at first. Dr. Urquhart says he dealt with these "firmly", and they haven't made trouble since. Eskimos have a wholesome respect for the great white lord-king who, from his golden throne far across the sea, can send his scarlet-coated police to see that his commands are obeyed.

By boat in summer and dog team or airplane in winter, Dr. Urquhart makes frequent long trips from his headquarters at Aklavik. Aklavik, "metropolis of the north," near the mouth of the mighty MacKenzie River, boasts two well equipped hospitals in the Anglican and Roman Catholic missions, eight white families and several hundred Eskimos and Indians. Dr. Urquhart is superintendent of both hospitals and performs many operations every year. At the Anglican mission is a modern x-ray machine, installed a few months ago.—*Toronto Telegram*, Jan. 24, 1933.

**Colonel J. T. Clarke, C.B.E., M.C., M.D.**, has been appointed acting Director-General of the St. John Ambulance Association in the room of the late Colonel Drum.

**The National Tuberculosis Association.**—The twenty-ninth Annual Meeting of this Association will take place at Toronto from June 26th to 30th.

### Book Reviews

**Diabetes Mellitus.** I. M. Rabinowitch, D.Sc., M.D., C.M., F.R.C.P.(C.), Assistant Professor of Medicine and Lecturer in Biochemistry, McGill University. Introduction by A. B. Macallum, M.A., M.B., Ph.D., D.Sc., LL.D., F.R.S. Price \$3.50. Macmillan Co., Toronto, 1933.

Dr. Rabinowitch has written this book on diabetes for practitioners and medical students. It presents in a concise, readable and simplified form the underlying principles of a rational treatment which experience has taught him to be most efficient. It outlines the diagnosis and management of diabetes in such a way that the practising physician can treat his diabetics successfully without an elaborate laboratory.

Dr. Rabinowitch aims to keep his diabetics at their daily occupation by giving them as normal a diet as is



possible. He emphasizes the use of a high-carbohydrate, low-calorie diet, and has thus pioneered a new and happier era for diabetics. This book is sane and comprehensive and can be highly recommended as one of the most worthwhile on the subject of diabetes.

F. G. BANTING

**Accommodation in the Human Eye.** A Thesis by R. A. Yeld, M.D. 55 pages, illustrated. Privately printed. Copies may be obtained from the author, Edgewood, B.C.

The thesis is divided in four sections, Anatomical, with bibliography; Physiological; Changes taking place in the eye during accommodation, and; Summary and additional notes, with bibliography. An attempt is made to harmonize where possible the opinions of many writers on the mechanism of accommodation and as an introduction the necessary anatomical details are pointed out.

In the Physiological Section the author deals first with Gullstrand on the Lens in Accommodation; and secondly, the views on the Hydraulic Theory of Accommodation (extrinsic) (in favour and against), are given.

In Part III, the changes taking place in the eye during accommodation are taken up, first dealing with extrinsic changes in accommodation under the following headings: The Ciliary Muscle, The Zonule, The Ciliary Processes, The Circum-lental Space, The Aqueous Humour, The Iris, The Vitreous Humour. The Intrinsic or Lenticular Changes in Accommodation are then dealt with under the heading of The Capsule, and Changes in the Lens. The views of Tscherning, Helmholtz, Fincham, Duane, Luedde, and Gullstrand are given and commented upon by Yeld, who regards accommodation as effected by the action of the ciliary muscle upon the lens in association with a variable degree of zonular relaxation, with a limited amount of external hydraulic pressure. There is an asymmetric action of the ciliary diaphragm varying with the position of the head so that the uppermost zonular fibres are less relaxed than the others in the circle. The intrinsic changes in the lens are brought about by relaxation of its capsule so that it becomes thicker along its axis with a reduction in its circumference and an increase of refractive index. The vital elasticity of the lens substance, though postulated by Helmholtz, has not in Yeld's opinion been actually proved or disproved in any detailed work published in the English language. Gullstrand and Kronfeld deny elasticity, and it is apparently not essential to the theory. A relative flattening of the margin of the lens, both in front and behind, which is due to the thickness and adherence of the capsule in the region of the equator has also a part in the mechanism of accommodation.

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those who would advise a highly radical operation involving grave risk. The predetermination and separation of progressive and non-progressive types would seem most important.

**Case Studies in the Psychopathology of Crime.** Ben Karpman, M.D., Psychotherapist, St. Elizabeth's Hospital, Washington, D.C. Vol. I, cases 1-4, 1042 pages. Price \$12.00. Mimeoform Press, Washington, 1933.

This is a large volume containing five case studies from the Department of the Criminal Insane (Howard Hall) at St. Elizabeth's Hospital. It is apparently planned to issue another volume dealing with the same cases "but concerning itself mainly with an intimate psychogenetic discussion of the material." Each case is reported in great detail taken from such sources as: official records, case records of the physician, observations by fellow inmates and attendants, patients' letters, and case conferences. Information was obtained from the patient by interview, questionnaire and biographical statement.

The studies provide much interesting information on the habits and practises of the so-called criminal, in prison and out of it. As to the scientific value of the work, opinions are likely to be divided. This volume is a presentation of case material, and we must await the second volume to see what use the author has been able to make of it. The records appear elaborate and yet they give little information as to the deeper mental processes operating in the individual cases. It may be that the author has reserved this data for the second volume.

The author forestalls some of the criticisms that may be made as to the validity of the data collected and, with these reservations in mind, one can only congratulate him on having produced a painstaking piece of work. Most of the material presented will sound only too familiar to those for whom it is intended, namely, members of the learned professions interested in crime and the criminal. We shall be even more interested in the forthcoming volume.

The volume is unusual in so far as it is mimeographed. This form does not lend itself to the making of what can be called a book, but it is probably the only way in which this work could be issued at the present time.

DAVID SLIGHT, M.D.

**Chapters in American Obstetrics.** Herbert Thomas, M.D., Associate Professor of Obstetrics and Gynecology, Yale University School of Medicine. 90 pages. Price \$2.00 postpaid. C. C. Thomas, Springfield and Baltimore, 1933.

This delightful little volume of biographical essays provides stimulating as well as interesting reading. The essays give well-written summaries of the lives of six of the early American obstetricians, as well as "Chapters on the Beginning of Obstetrics in America," but many references are made to the conditions of medical practice and to other celebrities of the time.

In this connection it is interesting to note that if the present economic situation continues we may shortly revert to the practice of many years ago. In 1634 the regular fee for the services of a midwife in Virginia was one hundred pounds of tobacco, and in 1781 Boston physicians demanded payment for obstetrics at the time of service. One hundred pounds of tobacco at the present time might be the means of making some obstetricians forget their worries.

In the essay on Samuel Bard there is a very interesting description of the activities of a medical student in Edinburgh in 1762, and one wonders how many present day students would be willing to work as hard for as many hours per day as was customary then. In the same essay there is an excellent summary of the beginnings of medical education in America.

The story of the introduction of the use of ergot

into scientific obstetrics is given in the chapter on John Stearns, and it is interesting to note that Stearns made a statement that "although often given to procure abortion, it does not appear to have succeeded." In spite of this observation one hundred years later we still find the attempt being made by the laity.

To anyone who has an interest in the history of obstetrics on the American continent this book will not only be of great interest, but is sure to lead to further reading along the same line. It is to be hoped that some writer may produce a similar work on the early Canadian obstetricians.

In the next edition certain typographical errors, such as that in line 5 on page 27 and in line 1 on page 60 would obviously be corrected.

**Practical Obstetrics, for Students and Practitioners.**

P. Brooke Bland, M.D., Professor of Obstetrics, and Thaddeus L. Montgomery, M.D., Associate in Obstetrics, Jefferson Medical College, Philadelphia. 730 pages, illustrated. Price \$8.00. F. A. Davis Co., Philadelphia, 1932.

At the outset it may be stated that this is a well balanced work which will prove a reliable guide. Current obstetric problems such as the effect of the hormones of the hypophysis and ovaries upon the endometrium, the various biological tests for early pregnancy, x-ray diagnosis of death of the fetus, avartin and the barbiturates as anesthetics, Potter version, and vaginitis due to *Trichomonas vaginalis*, are dealt with in such fashion as to make the work thoroughly up to date.

Regarding treatment, the various methods which have proved their worth are described, but special stress is naturally laid on the particular methods which the authors advocate and practise. Thus, for occipitoposterior positions, the methods of manual rotation, either alone or followed with forceps extraction, rotation with forceps, and internal podalic version are described, but preference is given to the first-named. The authors, wisely, we think, state that the treatment of eclampsia is largely along medical lines and that radical treatment, especially hasty or operative delivery, is now looked upon as actually harmful.

There are two useful chapters on the Newborn Child and Diseases and Disorders of the Newborn Child, one on Obstetric Jurisprudence and a section on Referred Reading. The book should prove useful to the student, the practitioner and the specialist. The reader, anticipating from the title a work like Tweedy's well known textbook, may wonder why the title *Practical Obstetrics* was chosen, but, apart from that, he will certainly not be disappointed. Both the authors and the publishers may be congratulated on producing such a valuable work.

**Problem Tendencies in Children.** Willard C. Olson, Ph.D., Director of Research in Child Development, University of Michigan. 92 pages. Price \$2.00. University of Minnesota Press, Minneapolis, 1932.

The study had as its objective (1) the development of techniques for studying problems of behaviour in quantitative terms, and (2) a statistical analysis of the results of their application in terms of such variables as age, grade, sex, achievement and intelligence. The investigation included the first grades of fifteen elementary schools, the eight grades of one elementary school, and the grades of one Junior High School. In addition, data were collected on problem-tendencies in pre-school children over a period of years, also data on pupils in one group of subnormal and one group of superior classes. The author defines for the purposes of this study a problem of behaviour as activity to which a social group—home, school and community—objects. A problem child is one who

manifests one or more behaviour problems. Later in the report he attempts to designate or identify a problem child in mathematical terms on the basis of his position on a distribution of problem-tendencies in a general school population.

This attempted quantitative approach to problem-tendencies in children has been carefully planned and carried through. The report of the study is suggestive and interesting. The author indicates that no attempt has been made to give a generalized interpretation of the findings in this report. In each grade studied the chronologically over-age and the mentally under-age child were found to be the greatest problems. Problem-tendencies, as measured by the Behaviour Rating Scale, appear to be more closely related to achievement as measured by standardized tests than to general mental ability as measured by intelligence tests. This report is worth the careful study of any one interested in the study of school achievement and social behaviour of children of school age.

**Clinical Ophthalmology for House-Surgeons and Students.** J. Myles Bickerton, M.A., B.Ch., F.R.C.S., Senior Ophthalmic Surgeon, King's College Hospital, etc., and L. H. Savin, M.D., M.R.C.P., F.R.C.S., Junior Ophthalmic Surgeon, King's College Hospital, etc. VIII and 158 pages, illustrated. Price 7/6 net. H. K. Lewis & Co., London, 1933.

This little book is designed to meet the needs of the ordinary medical student and house surgeon. Its subject matter is, for the most part, based on the questions submitted at examinations for the past twenty years. It may be concluded, therefore, with certainty that the book covers the most important and practical subjects in ophthalmology; also that it is not adapted to the requirements of the specialist. The first chapter is a most useful and practical one as it deals with the examination of the case as it presents itself. The treatment of this most important subject is simple, direct, and systematic, and the meaning of the various aberrations from the normal is clearly given. The chief affections of the eye are taken up in order, as the various structures are involved, and the treatment is outlined. A number of very helpful pictures are given, illustrating the common lesions of the fundus. One chapter is devoted to selected ophthalmic formulae, and another to the various instruments required in ophthalmological work, which are freely illustrated. The book is well designed for its purpose, and can be cordially recommended.

**Injuries of the Eye.** Harry Vanderbilt Würdemann, M.D., Sc.D., F.A.C.S., Medical Examiner, Aeronautics Branch, U.S. Department of Commerce, Seattle. Second edition. 900 pages, illustrated. Price \$15.00. C. V. Mosby Co., St. Louis; Mc-Ainsh & Co., Toronto, 1932.

The foreword in this book says that it is offered as an "exhaustive and authoritative work on injuries of the eye," and when one has read it, he feels that it justifies what its maker promises. The first question one asks when he takes it in hand, is, "How can a man fill nine hundred pages with important and useful information on so circumscribed a subject?" Yet he has done that very thing. Moreover, it is written in a most interesting manner, for after discussing the various types of accident and injury (covering practically everything that can be thought of) he briefly cites cases of his own, or quotes from the literature those reported by others, which illustrate the points he makes.

There is no attempt at spectacular book-making. The story is simply told; the details quietly set down; the discussion is free from elaborate technicalities, and bristling with common-sense; the suggestions are eminently practical.

All kinds of injuries are written about; injuries to the eye at birth; all types of industrial accidents; complications of operative misfortunes, *e.g.*, an excellent chapter on sympathetic inflammation; x-ray localization of foreign bodies in the globe; treatment of detachment of the retina; ocular muscle dysfunction resulting from injury to certain cranial nerves (this might be more elaborate); and many others. Finally, there is a useful chapter on the medico-legal and the legislative-protective aspects of the subject. The illustrations are numerous and clarify the text; most of the best of them are from the author's own hand. The proof-reader has allowed some errors to slip through, but this is forgiven him because the encyclopædic usefulness of the book is so evident.

**Medicine Among the American Indians.** Eric Stone, M.D., Providence, R.I. Clio Medica Series No. 7. 139 pages, illustrated. Price \$1.50. Paul B. Hoeber, New York, 1932.

This is No. VII of the Clio Medica series of primers on the History of Medicine. Not only has the author gathered widely from numerous medical and other journals and books but he has also included accounts and skilful illustrations of his own observations made in first-hand contact with his subject, rescuing many valuable details of ceremonies and procedures that are fast disappearing, and giving insight into the mental and spiritual life of a primitive people. A map of the locus of the Indian in the United States shows some 80 tribes, widely distributed into every state of the Union, and indicating the great antiquity of the Amerind (handy abbreviation of "American Indian").

For the Indian all objects were inhabited by spirits; disease was the result of the displeasure of a spirit; cure required the driving out or the conciliation of the offended spirit; hence Indian medicine is essentially theurgical. Objects could be endowed with magical properties by appropriate ceremonies and were potent, some to cure disease, others to ensure success in hunting or battle. Medicine men were chosen in various ways; usually they were apprenticed, under exorbitant fees; and women were not excluded from the craft. Pay for services was adjustable to the ability of the patient, and was made in kind or in wampum. Failure to effect a cure rendered the doctor liable to the relatives for punishment or damages. ". . . the medical practices of the Indians, living in the practical equivalent of our Stone Age . . . were in many respects effective. . . much had a rational basis and at a few points they were in advance of their (chronological) day and age." One may add that the equivalent of much Indian medicine is extant in many places among the whites to-day. The story of the ravages of the white man's diseases, new-brought to the Indians, is most tragic. The Indian had no racial immunity to contagions, which "spread like wildfire and were more effective in subjugating the savage (white man's libel) than all the military expeditions sent against them." Neoplasms are apparently very rare in pure Indians, as also are obesity, arteriosclerosis and heart disease, endocrine diseases and insanity. Feast-or-famine made dyspepsia common; teepee smoke caused much eye-trouble; wounds, fractures and dislocations were common and were skilfully treated. "The Indian took emetics as frequently and casually as the white takes laxatives. . . . In many tribes everyone took an emetic daily as a matter of common decency. . . . often as symbolic of purification. . . all knew the use of the feather in producing the desired result." (May not the Indian have learned much from his dog?) Drugs coming to us from the Indian include cascara sagrada, American aloes, mandrake (*podophyllum*) and jalap; evidently they purged as well as puked. They practised drainage for pleurisy with effusion, cupping for "pain in the chest," and



used moxas as counterirritant. Snake-bites were treated by suction and excision, and by applying chewed Kub-bi-ze root which "quickly reduced the swelling and pain and in some way seemed to neutralize the venom." The Indians are said to have immunized themselves by submitting to the bite of a young snake with weak virus, gradually increasing the age to full maturity.

This book is really a convenient pocketful of profitable entertainment for all, from obstetrician to psychotherapist.

**The Medical Annual, A Year-Book of Treatment and Practitioners' Index.** Edited by Carey F. Coombs, M.D., F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc., F.R.C.S. 676 pages, illustrated. Price 20s. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1932.

The first issue of the Medical Annual appeared in 1883, so the present volume is the fiftieth annual publication. The illustrations are more numerous. The articles are well selected to record the progress in medicine. The volume contains an index of new pharmaceutical preparations and surgical appliances, a list of the principal English medical works and new editions published in 1931, and a list of medical institutions, homes, spas, etc., in the British Isles. The editors and publishers are to be congratulated upon their Jubilee number.

**Practical Anaesthesia.** Monographs of Baker Institute of Medical Research, No. 1. By various authors. 250 pages, illustrated. Price, 10/6d. Published at Baker Institute for Medical Research, Alfred Hospital, Melbourne, Australia, 1932.

This, the first of a series of monographs published by the Baker Institute of Medical Research of Australia, is a highly creditable achievement. It is intended for the instruction of medical students and young graduates in the practical aspects of modern anaesthesia. It is difficult to recall a book on this subject which presents the facts so clearly and in such small compass. In spite of its compactness no important methods of inducing anaesthesia seem to have been omitted.

The authors take up in one chapter the question of anaesthetic fatalities, and produce statistics and an interesting graph covering 105 deaths under anaesthetics. As might be expected chloroform, chloroform-ether mixtures and ethyl chloride were the chief offenders. It is doubtful if the use of chloroform and ether mixtures or the chloroform-ether sequence can be defended on any grounds, with the modern resources of inducing anaesthesia at our disposal.

The book is profusely illustrated and, what is more important, thoroughly indexed and cross-indexed. There is an extensive bibliography at the end of each chapter, indicating the care which the authors have devoted to their contributions. It is attractively bound and printed and generally reflects great credit on the publishers. The authors and Australian anaesthetists generally are to be congratulated on the selection of their specialty as the subject matter for Number One of this series of monographs.

**Fungous Diseases.** Harry P. Jacobson, M.D., Attending Dermatologist and Member of the Malignancy Board, Los Angeles County General Hospital. 317 pages, illustrated. Price, \$5.50. Charles C. Thomas, Springfield, and Baltimore, 1932.

The medical world realizes to-day more and more the importance of fungous infections. The prevalence of superficial dermatological inflammations due to a fungus is attested by the enormous literature of the past years on the subject, which has dealt with clinical and mycological aspects alike, owing to increased research in this field, and we know that

fungous infections involve other deeper seated structures as well. The physician in search of further information on this subject has hitherto had to depend upon articles often appearing in literature not readily at hand, and often, indeed, difficult to procure. The publication of this work, embracing, as it does, old and recent research on this subject, is indeed timely. The book presents the clinical aspects of fungous infections; thus, ringworm infections of the skin, blastomycosis, actinomycosis, torulosis, sporotrichosis and other such infections, are dealt with extensively. It may be thought that certain aspects of ringworm as the trichophytides might have been included in a survey of this kind. The author does, however, devote attention to the involvement of deeper structures by these mycotic and yeast organisms. At the same time, he details the laboratory and other measures necessary for an accurate mycological diagnosis, and this is, we believe, where this treatise is of special value.

The book is easy to read both as regards the quality of its text and its legibility. The illustrations are fairly numerous and are good. Therapeutical measures are concise. Altogether, the book is to be commended, in that it correlates the clinical with the mycological necessities of fungous diseases, and therefore is of unique value, especially to the practitioner and the mycologist.

**Principles and Practice of Otology.** F. W. Watkyn-Thomas, F.R.C.S., B.Ch., Surgeon, Central London Throat and Ear Hospital, etc., and A. Lowndes Yates, M.C., M.D., F.R.C.S., Honorary Assistant Surgeon, Ear and Throat Department, Prince of Wales Hospital. 555 pages, illustrated. Price, 25/- net. H. K. Lewis, London, 1932.

In this volume the authors have attempted to combine the details of modern otology for the use of the general practitioner, the intending specialist, candidates for the Diploma of Laryngology and Otology and other higher degrees in surgery. The practical anatomy of the ear is well given, without burdening the reader with unnecessary detail. A considerable amount of space has been devoted to the chapters on hearing and hearing tests, but, as the subject is of fundamental importance, this is quite justified.

One of the most interesting and instructive sections is that on the routine examination of the ear. Written by Mr. A. Lowndes Yates, the subject is taken up from a little different angle from that of most text books.

A practical point worthy of note is found in the chapter on chronic suppurative otitis media. In referring to tuberculous infection of the middle ear, the authors state that, "multiple perforations of the drum may occur, but have no special clinical significance; moreover, multiple perforations are not pathognomonic of tuberculosis." Although the above is quite true it is contrary to the statements copied from one text-book on otology to the next, for the past forty years, namely, that multiple perforations of the drum are pathognomonic of tuberculosis.

In conclusion, it may be said that this book should be of great value both to the student of otology and the practising specialist.

**Operative Surgery.** Alexander Miles, M.D., LL.D., F.R.C.S.Ed., Consulting Surgeon, Royal Infirmary, Edinburgh, and D. P. D. Wilkie, M.D., F.R.C.S.Ed. and Eng., Professor of Surgery, University of Edinburgh. 590 pages, illustrated. Price \$6.00. Oxford University Press, London; McInsh & Co., Toronto, 1933.

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a single volume of moderate proportions." The foregoing quotation from the authors' preface must be taken into consideration by the reader so that he can properly value its contents, for, as the authors state, the technique described for each operation represents what they have found best and in this represents the practice of the Edinburgh school. The book covers the entire field of surgery with the exception of gynaecology, the various sections being written by various collaborators. The style, however, is uniform throughout, the text being well written, concise and clearly descriptive. Very good illustrations are inserted and very materially assist the text in describing technique. Preceding each section is a short description of the anatomy involved, the aim being to make the anatomical study one of practical application. On account of the large field to be covered only rarely is any attempt made to describe more than one method of operation. The section on abdominal surgery contains a well written part on abdominal incisions and their closure and this will commend itself to many readers. Throughout the book occasional instances occur where not quite enough thought has been given to some minor details which make for success or failure in any operation. A notable example of this occurs in the descriptions of blood transfusions, where the method of inserting the needles and their retention in place have been omitted.

On the whole it is doubtful if any better book exists on operative surgery compiled in one handy readable volume. It should form a valuable addition to any private library.

**The Common Causes of Chronic Indigestion.** Thomas C. Hunt, B.A., D.M., M.R.C.P., Physician to Out-Patients, St. Mary's Hospital, London. 341 pages, illustrated. Price \$3.75. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1933.

The author of this volume has endeavoured to set forth clearly and briefly the common causes of chronic indigestion and to present the differential diagnosis and treatment. That this was a most difficult undertaking is obvious and it has been accomplished with success. The medical literature on this subject, which is so voluminous and often contradictory, is carefully summarized and many statements are supported by the author's personal experience. The chapters on chronic gastritis and chronic appendicitis and those dealing with functional disorders are exceptionally interesting and valuable. At the end of the book there is a summary of methods of investigation, suggestions *re* prescriptions and an excellent bibliography.

In a work such as this which deals with a broad subject so briefly it is natural that some faults may be found. For instance, few will agree to the didactic statement that the ambulant treatment of peptic ulcer "must never be expected to succeed." However such minor criticisms do not detract from the value of the book as a whole. There was a definite need for a work which brings up-to-date our knowledge of chronic indigestion and that need has been well fulfilled.

**Inherited Abnormalities of the Skin.** E. A. Cockayne, D.M., F.R.C.P., Physician to Middlesex Hospital. 394 pages. Price \$10.50. Oxford University Press, London; McAinsh & Co., Toronto, 1933.

This is not an album of circus curiosities but a book bridge between two divisions of the profession. Genetics is assuming an increasing importance in medicine. It is obvious that ultimately there comes a time when the deductions made by growing peas or mating fruit flies must be tested as to their applicability to human beings. "The proper study of mankind is man." Cockayne rightly points out that of all organs the skin is the best suited for that study. There are probably just as many, as interesting, and as important abnormalities of the internal organs as there are of the skin, but while even minor defects are easily detected in the skin, in the other organs they are only discovered at operation or autopsy. Cockayne's avowed object was

to present a book of reference for the dermatologist and for the geneticist, with the hope that they might co-operate with mutual benefit. The author believes that this is the first time that anything of this nature has been attempted.

About 50 pages are devoted to an exposition of the modern conception of heredity, with emphasis on the human aspect. This presentation of itself is well worth while. In the remainder of the book a description is given of inherited abnormalities of the skin and its appendages. Necessarily these descriptions are very concise, because there are nearly 200 headings. With each there is an analysis of the probable mode of transmission and a very complete and valuable bibliography.

Most frequently these abnormalities are not first seen by the dermatologist or the geneticist but by the general practitioner, and it is nowhere stated that the book is for him. Since, however, the genetics has been written with consideration for the dermatologist, and the dermatology has been kept within reach of the medically trained geneticist, it naturally follows that it is unusually well adapted to the reference needs of the great mass of the profession.

**The Gold-Headed Cane.** William Macmichael, M.D. Edited by H. S. Robinson. 223 pages, illustrated. Price \$3.50. Froben Press, New York, 1932.

A good story always bears re-telling, whether it be "auld grouse in t' gun room," or the reminiscences of the intimate companion of five famous physicians, the discreet and observing Gold-Headed Cane.

The device of making the cane tell his story for him was no new one with Macmichael, but not many other writers chose a more appropriate medium through which to speak, or spoke more interestingly through their medium. This oblique method has gone out of fashion nowadays, but there are probably still other directions in which it might be exploited. The description of the daily routine of a red blood corpuscle might teach a lesson in haematology: or, the adventures of a leucocyte might tell us of the tortuous paths through which it has to wander, and how it climbs through the intercellular crannies, to say nothing of the strange assortment of materials it meets and deals with. Such possibilities have not yet been used, as far as the reviewer is aware. Perhaps the reading of this new edition will stimulate someone to their employment. In any case, it will take its place among the editions as one of the fullest and most attractively prepared. Fortunately, Mr. Robinson has not denied himself much in the fullness of his notes, from quoting the inscription over Dame Mary Page who "in 67 months was tapped 66 times: had taken away 240 gallons of water without ever repining at her case or ever fearing the operation," to an extract from Pepys describing the first experiments before the Royal Society on the transfusion of blood in dogs, in which, as only Pepys could, he relates that it "did give occasion to many pretty wishes, as of the blood of a Quaker to be let into an Archbishop, and such like. . . ."

In this edition the Gold-Headed Cane has not been revived so much as it has been reintroduced. The biographical sketch and very full notes will add much for those who already know the book. For those who do not, it is a very good time to begin.

#### BOOKS RECEIVED

**Introduction to Sexual Hygiene.** A. Buschke, M.D., and F. Jacobsohn, M.D. Translated from the German by Eden and Cedar Paul. 193 pages. Price 7/6 net. George Routledge & Sons, London, 1932.

**Calcium Metabolism and Calcium Therapy.** Abraham Cantarow, M.D., Instructor in Medicine, Jefferson Medical College. Second edition revised. 252 pages. Price \$2.50. Lea & Febiger, Philadelphia, 1933.

